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Vol. XVIII. Part 10.

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The Journal of the Department of Agriculture of Victoria, Australia.

October, 1920.

PRINCIPAL CONTENTS

The Practical Value of Agricultural Education

Field Tests with Sugar Beet

Small Fruit Culture

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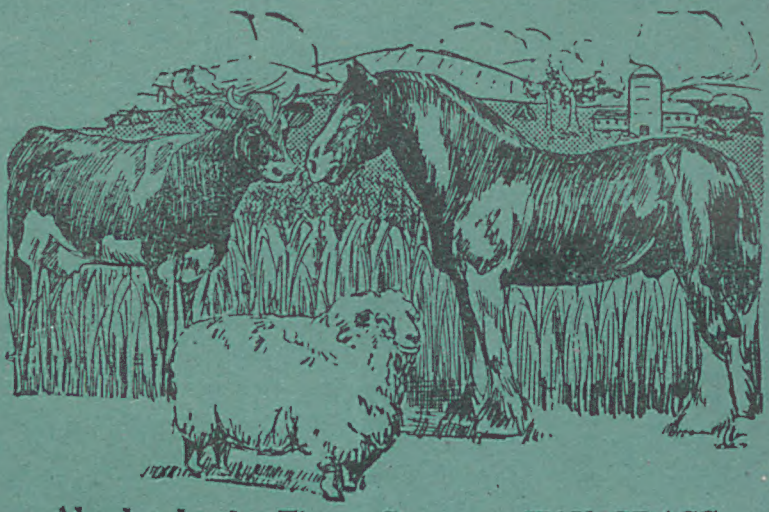

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OF

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CONTENTS.—OCTOBER, 1920.

		PAGE
The Practical Value of Agricultural Education	*A. E. V. Richardson, M.A., B.Sc.*	577
Field Tests with Sugar Beet	*A. E. V. Richardson, M.A., B.Sc.*	587
Small Fruit Culture (continued)	*A. A. Hammond*	593
Cleanliness in the Dairy	*A. Mess*	600
Pomological Committee Conference	*E. E. Pescott, F.L.S.*	602
A Farm Well—Plans and Specifications		607
Spring Grafting of Old-Established Vines	*F. de Castella*	610
Farmers' Field Day at Werribee		615
Notes on Experimental Work at State Research Farm, Werribee	*G. S. Gordon*	617
Hen's Plumage Changes to that of Male		620
A Wool Calendar		621
Stallions Registered for 1920–21		622
Victorian Rainfall—Second Quarter 1920		635
Production of Mint for its Oil		636
Orchard and Garden Notes		637
Reminders		639

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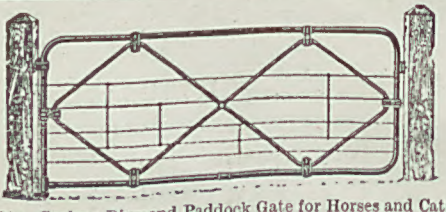

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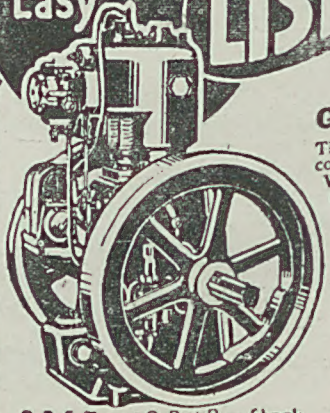

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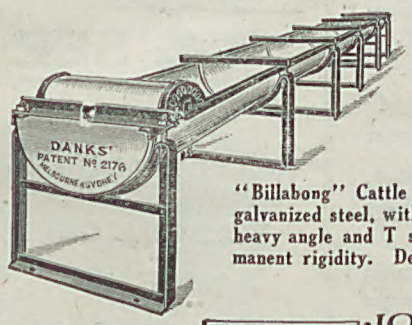

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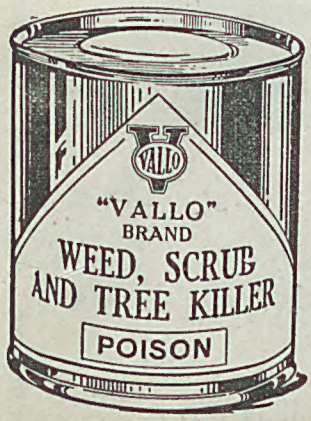

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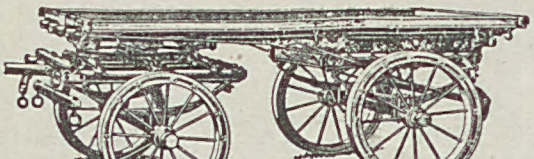

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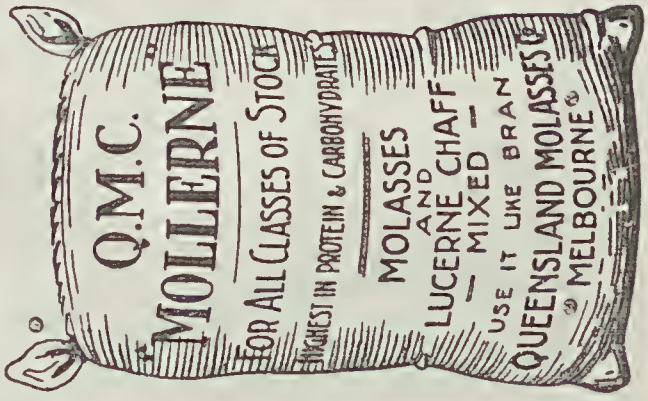

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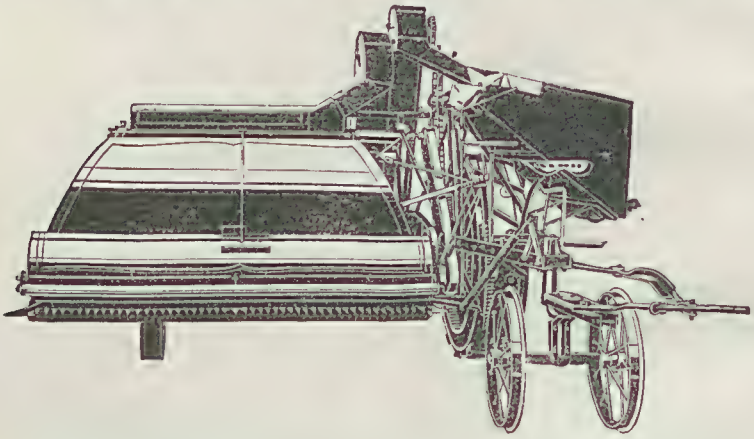

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THE PRACTICAL VALUE OF AGRICULTURAL EDUCATION.*

A. E. V. Richardson, M.A., B.Sc., Agricultural Superintendent.

Your executive has asked me to address you on the subject of the practical value of agricultural education. Let me begin by asking whether any form of education is of practical value.

One of the most significant educational facts of the time is that men of all classes have come to look upon education as a thing that will somehow better their condition, by which they mean that it is something that will make their labour more effective, and will enable them to lead fuller lives.

They, perhaps, have no clear idea of the methods for bringing this about, but to better their condition through education is the abiding faith and purpose of men everywhere.

Formerly education was provided for the privileged few. To-day it is freely provided for all who can prove themselves worthy of it. It is quite a modern theory that the State should support education, and that education should be free. The training of the young is no longer left to the charity of the church or to private endowment. We no longer require a parent to pay for the schooling of his child, for we have come to recognise that, in the last analysis, the child belongs to the community, and that public welfare demands that he be educated up to a certain standard. This is not sentiment; it is business. It is not charity; it is statesmanship.

The State, by making primary education free and compulsory, admits the value of a general education for its future citizens.

* An address delivered at the Convention of the Chamber of Agriculture at Port Fairy, June, 1920.

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Is Agricultural Education of Value?

But what of higher education—technical and industrial education—and in particular agricultural education? Is education by means of agriculture of practical value for those who acquire it? It will, I think, be readily conceded by all that some forms of higher education are of distinct practical value to those receiving it. Take, for instance, engineering. Could a man design and construct locomotives, power plants, electrical machinery, bridges, without having undergone special training and having a thorough theoretical and practical grasp of the principles involved? Specialized training is undoubtedly of practical value for him, because it increases his efficiency and his capacity to attack complex engineering problems and solve them.

Is a specialized training in agriculture of like value to the future farmer? The type of training which one would obtain under a properly conceived system of agricultural education would be of undoubted practical value to the farmer.

If we desire to see the value of agricultural education we must turn to those countries where systematic and organized instruction in agriculture has been in vogue for several generations, and where ample opportunity has been provided for testing out the practical value of such education. Among such countries the United States stands pre-eminent, for nearly sixty years have elapsed since President Lincoln gave his assent to the Bill which created the agricultural education system of America. After sixty years of effort the American Agricultural Colleges and Experiment Stations have become the most unique, useful, and popular group of educational institutions in the country, and receive the widest possible support from all classes of farmers.

Americans have the reputation of being a very businesslike and very practical nation, requiring a dollar's worth of result for every dollar of expenditure. But on no form of education have the State and Federal Governments lavished money so freely as on agricultural education.

The annual appropriations for agricultural education, agricultural investigation, and extension work in the United States approximate £12,000,000. This is an enormous sum to spend on agricultural education; and yet the Government and the people are satisfied that the money spent is a handsome investment, which is repaid to the nation many times over in the form of increased agricultural production and national prosperity. They look at the problem from the points of view—(1) the value of agricultural education in developing the State, (2) its value to the future farmer.

Their system of agricultural education tends to make the future farmers more efficient in their calling and better citizens. Efficiency and citizenship are the objectives of the agricultural colleges.

From the point of view of the nation, the expenditure on agricultural education, large as it is, is repaid nearly ten times over in the form of increased production from agriculture. For the past fifteen years agricultural production had been increasing at the rate of £90,000,000 per annum; and £90,000,000 per annum is a fine return for the amount spent on agricultural education. That is their main

justification for agricultural education. It pays the nation handsomely as an investment.

Let us examine their objectives in agricultural education a little more closely.

The fundamental purpose is the development of agriculture as a productive occupation, and of the agricultural people as an important part of the social and political fabric.

Development is the central thought in educational activity, and the bringing of agricultural education to its highest possible limit, both as a business and as a mode of life, is the purpose for which the colleges and stations were founded and supported by the public.

The improvement of agriculture until it is profitable and productive, and until the rural districts are comfortable and the rural people are educated—these are the specific aims of American educationalists.

Agriculture must be made profitable, because farming is a business, and the first and fundamental step is to put it on a paying basis. The colleges and experimental stations have devoted their main efforts to increasing the profits from farming, and demonstrating how manures, new varieties of seed, and varying cultural practices will bring about better results.

Agriculture must be made productive, and it must more than keep pace with the rapidly increasing population. America took 300 years to get the first 5,000,000 people, and it has increased its population by 100,000,000 during the last ninety years. If population increases at the same rate during the next fifty years as it has during the last twenty-five years America will have a population equal to China inside fifty years. It is the business of agriculturists to learn how to feed this rapidly increasing population and feed them well.

So much for the business side of agriculture—an agriculture reasonably profitable, highly productive. What, now, on the human side? What is to be the development of the farmer as a man to match the development of his business as an occupation?

Agriculture is not only a business, but it is a mode of life as well, and if it is to be successful in the latter it must afford its devotees the same comforts of life as are obtainable in other occupations. This has not hitherto been possible, but its realization is becoming every day more probable, for one of the distinctive developments in American farm life is the establishment of comforts and conveniences in the farm homes.

The farmer has hitherto provided himself with all sorts of machinery and ingenious mechanical devices to cheapen production and make labour easier for himself, his hired help, and even his animals. In the meantime the wife gets on with no real conveniences and no comfortable home, living and scraping along for the day when the family shall build its home in town and "have the conveniences."

Many a man has turned his back upon the farm that made his wealth and stripped the land of its fertility to build in the town the home to which the farm was entitled.

Farming and pioneering started off together, and the life of the pioneer farmer was hard, not because he was a farmer, but because he was a pioneer. Nature was unsubdued, men and women were poor, and life was hard indeed when necessities were counted as luxuries.

But those days are over on real agricultural lands, and farming is coming into its own; but it will not come fully into its own until farmers learn to build comfortable houses for themselves and their children, and install some of the conveniences that are regarded as essential in every city home. That is what is meant by saying the country must be comfortable.

Finally, the men and women who live upon the land and till the soil—it is really the nation's soil and not theirs—should be given an education which will make them efficient in a business way, and which will make them good citizens as well.

These, then, are the main objects of agricultural education in America—the development of agriculture until it shall be profitable, productive, permanent, until the country districts are comfortable, and the rural people educated.

Now, if this development of agriculture were merely the concern of farmers, they might be left to provide for it themselves. But in the final analysis the development of agriculture is a public question. The farmers are interested, of course; but even if they were not interested, the nation should still insist, for public reasons, that agriculture be developed to the utmost. The farmers will reap the first advantages of such improvement, but they can realize no advantages that are not shared by the whole community.

The development of agriculture is therefore a matter of vital public concern, and any money spent on it is an investment in the safest bank on earth—the soil of the Commonwealth, and the people on whom the nation must depend for its management.

So much for the national point of view. Now for the individual most concerned—the young farmer.

For a young man who takes up farming an agricultural education is especially necessary, and for the following reasons:—

1. Farming in the past has not been a capitalized industry, and failure was almost impossible. In the past land was cheap and plentiful, and was very productive because it had the fertility of the ages stored within it. But to-day the young man who takes up a farm has to purchase land which may cost from three to ten times what it did forty years ago, and he has to farm land which has lost much of its fertility through improvident cropping.

Farming now requires the outlay of a considerable amount of capital for the purchase of land and equipment, and the young man who engages in it will require at least as much training and managerial ability as he who engages in business pursuits in the city. Failures will be relatively easy, for the new discoveries of science, while they tend to establish the business on a sounder basis, do not make it any easier for novices or men of low capacity.

2. The young farmer must fight against more destructive insect and fungoid pests than any farmer preceding him, and new pests and noxious weeds are appearing every year.

3. He faces new problems in marketing and in farm management.

The young farmer finds in all these things a challenge to his very best ability and finest courage, and he must face these problems, not only with experience, but also with science as his ally and his intelligence broadened by the best education.

I cannot now wait to describe the many-sided activities that are undertaken for the benefit of the farming community, but a brief review of the main features may be given.

Agricultural education, taken in the broadest sense of the term, may be said to cover all those activities that are undertaken for the promotion of sound and profitable agriculture. These may be classified briefly as—(1) Instructional work; (2) investigational work; (3) extension work.

By instructional work we mean all the formal teaching of agriculture from the primary schools to the University.

The investigational work involves the discovery of new facts and principles pertaining to agriculture.

By publicity or extension work is meant the conveyance and dissemination of agricultural information to those who are unable to take advantage of the formal teaching of the schools and colleges.

The three great institutions are—(1) the Agricultural College; (2) the Experimental Station; (3) the Federated Department of Agriculture.

The Agricultural Colleges were born in the throes of the civil war—at a time when the very existence of the nation was at stake—when doubt and pessimism seemed to reign supreme. They have had a chequered career. At first they attracted no students. To-day they are crowded. Forty years of failure and twelve years of dazzling success is the epitome of the history of the colleges.

Last year 130,000 students were registered in the fifty-three colleges of agriculture in the United States, and of these 16,000 were undergoing a four years' course for the degree of Agricultural Science. It would take me too long to trace the history of the colleges, but success came when the Federal and State Governments began to invest money liberally in the colleges and provide them with proper equipment and high-class specialists as teachers.

Twenty years ago the students came to the colleges fresh from the cornfields with no prior training. Now, however, they must have a high school training before they are allowed to enter the colleges.

The curriculum has gradually developed in such a way as to secure a unique blend of the vocational and non-vocational in varying proportions, with enough of both to turn out an efficient business man without sacrificing his education as a citizen.

The authorities aim at making a good farmer, but they aim, too, at making the student a good citizen as well.

Ninety-five per cent. of the students who graduate from the colleges either go on the land or take up some form of agricultural work—teaching, investigational work, or extension work. Of those who do not graduate practically, all return to the land. In either case failures are almost unknown.

For those who cannot attend the full course, short courses extending from two weeks to two months are held, so that they who desire to increase their knowledge of agriculture may do so. These courses are given by specialists, and thousands of farmers attend them every year. At Ohio there were over 3,000 farmers in attendance at the College of Agriculture at the time of my visit.

Agricultural investigation and research work is regarded both in the United States and Canada as a necessary and vital part of any system of agricultural education, and must form the basis for framing a sound policy for future agricultural development.

The American experimental stations were founded by the Federal Government in response to a desire for aid in solving problems in American agriculture and to perfect methods of improving agricultural practice. There are sixty of these experiment stations, and the average expenditure on each is £18,400 per annum.

The Experiment Stations.

Some idea of what a single experiment station has accomplished during the last century may be obtained by considering the results obtained at Wisconsin.

It is demonstrable that the added wealth of the State of Wisconsin each year, as a result of the activities of the experiment station, is many times the whole appropriation made by Wisconsin for agricultural education.

Of the seven tests widely used in dairying, six originated at the Wisconsin Station. The Babcock fat test, invented in 1890, furnished a simple means of paying for milk on the basis of quality and for detecting fraud. The greatest service of the Babcock fat test, however, has been in making possible the improvement of dairy cows by eliminating unprofitable animals, and thus giving a scientifically accurate foundation for dairying.

Many improvements in dairy processes relating to the pasteurization of milk, curing of cheese, have originated at this Station.

The tests and experiments made at the Experiment Station, which together form the most important contribution ever made to the science of dairying, and the work of the Wisconsin Dairy School, have enabled Wisconsin to gain the first rank among the States of the United States in the production of both cheese and butter.

Since the Babcock fat test was discovered, the value of the dairy products of the State has increased from £4,000,000 to £16,000,000 per annum. It cannot be doubted that a considerable percentage of this increase has been due to the campaign of investigation and education which has been carried on by the University.

New varieties of maize, barley, and oats have been evolved at the station, and have added millions of bushels annually to the yields of Wisconsin fields.

Wisconsin has now, despite many disadvantages, won first place in the production of dairy products, cheese, and butter, among the American States. That Wisconsin's dairy production has quadrupled during the last twenty years, is due chiefly to the leadership and work of the dairy school of the experiment station. In addition to the output of dairy products, Wisconsin's cereal yield is considerable. Though only two-thirds the size of Victoria, and though the northern half of the State is mostly poor land in need of drainage, Wisconsin, besides producing £16,000,000 worth of dairy produce, raises 100,000,000 bushels of oats, 70,000,000 bushels of maize, and 25,000,000 bushels of barley.

Extension Work.

The most significant feature in agricultural education in the United States during recent years is the development of the publicity or extension service in each State.

The object of the extension work is to disseminate as widely as possible the mass of information which has been accumulated as a result of the investigations of the experiment stations and agricultural colleges.

Since the experiment stations were founded there has been gained by patient investigation sufficient exact knowledge of soils, crops, and farm animals to enable the total wealth from agricultural production to be greatly augmented, if the information could be widely disseminated and brought home to the last farm and last farmer.

This is the function of the publicity or extension service. Nearly every one of the 3,000 counties of the United States has a county agent —a trained agriculturist located in the district—who works in co-operation with local organizations to advance agricultural interests and improve agricultural practice in the county. He is the servant of all the farmers of the county, and his aim is to reach and give service to the largest possible number of persons in his district.

These, then, are the main features of the agricultural education system of the United States:—

(1) A group of colleges, mostly of University rank, splendidly equipped and manned by a staff of agricultural specialists. These colleges provide four-year courses of instruction to students, and in addition short courses for those who cannot spare the time to attend the full courses.

(2) A group of experiment stations, also splendidly equipped and manned, for the purpose of investigating problems in every branch of farming.

(3) A staff of extension workers, publicity men, and county agents, also highly-trained men, whose duty it is to present to the farmers in simple language the results of the work of the experiment stations and colleges.

(4) And, finally, a Federal Department of Agriculture, working in very closest co-operation with the colleges and experiment stations in the work of education and investigation.

The Lesson from America.

The general lesson to be learned from America's effort in agricultural education is—

(1) Money spent on agricultural education is returned many times over in the form of increased agricultural production.

(2) To develop an efficient system of agricultural education, you must begin from the top of the educational ladder—the University—and work downwards towards the schools.

The problem of agricultural education resolves itself ultimately into the problem of providing a sufficiency of trained teachers, agricultural specialists, and extension workers, and using them in an organized scheme of instruction, investigation, and extension. That is

the clear and unmistakable lesson to be learned from American efforts in agricultural education.

We need trained teachers of agriculture for our agricultural colleges and high schools, trained specialists in agriculture and stock husbandry to foster and assist in developing the agricultural and stock industries of the State. We need trained research workers to establish, by investigation and experiment, the principles underlying the successful culture of our crops. Provision has been made for some of this work to be done under the Agricultural Education Act passed last session.

(3) That when the colleges are properly staffed with specialists and provided with adequate teaching facilities, they will be well supported by the community, and in particular by the agriculturists and farmers in whose interests they were established.

Agricultural education is a matter of vital public concern. Everybody agrees that this is to be a different world after the war, but no thoughtful man can fail to be struck by the character of the economic and social questions that loom large in connexion with reconstruction—the struggle between capital and labour, the minimum wage, the maximum day, time and a half for overtime, governmental oversight of private enterprises.

For the most part, our reconstruction problems are reduced to three great questions that mainly concern the public mind—(1) repatriation, (2) foreign trade and the Tariff, (3) and the perennial contest between labour and capital.

We overlook the farmer citizen because we have been accustomed to think politically and socially mainly in terms of commerce based on industry under conditions requiring large combinations of capital, concentration of population, and division of labour—conditions that inspire greed and social unrest.

If you were to ask a business man what the farmer needed, he would likely say that he needs to work to better purpose; he, doubtless, needs more capital; and he certainly needs to organize his affairs according to modern business methods, and to know better than he does what things cost him.

If you were to ask a farmer, he would probably say that he wants better educational opportunities for his children, because at present they must leave the parental roof at a tender age; or else he must abandon his home and his business, and go to town if his children are to receive the same educational advantages as the plumber and the day labourer.

Much has been done in Victoria to meet this need, but until we succeed in providing for the children of the farm the same educational facilities as are provided in the cities, the open country and farming will be handicapped.

The chief difficulties, of course, are the low tax-paying ability of the open country as compared with the congested city, and the high *per capita* cost of instruction in the country.

But this burden must be assumed by the public in some way, even to the extent of heavily subsidizing rural education, for, if not, we shall ultimately have something approaching a peasant population on our farms.

Next to lack of educational facilities for his children, the farmer will say that his income from his business has been inadequate to enable him to maintain himself on the same scale of living as that provided through other occupations requiring equal or even less preparation, industry, or investment.

If the farmer were asked for proof, he might say that the labour income from farming, in the majority of cases, is very small. We are not considering the exceptional man, or what might be done; but we should consider what the great mass of farmers are earning through the production of staple foods under conditions that have prevailed.

The farmer will probably confess that he has been criticised for refusing to pay good wages, and that he has thereby lost the bulk of his best labour, and even his own sons, who have gone to the city, and can earn 12s. to 14s. per day of eight hours, with time and a half for overtime.

He will point out that he has been criticised for his failure to provide modern conveniences in the farm home for his wife. He might be able to show that if he paid the minimum wage demanded by the labour unions, and time and a half for overtime, he would either be compelled to give up his farm, or that the cost of food would ultimately be immensely increased.

I think it can be readily shown by a system of accounting that if you were to take into consideration the average wheat yield of the State (11 bushels per acre), and the average price of wheat prior to the war (3s. 4d. per bushel), and charge the farm with all business charges, *e.g.*, interest on capital, depreciation, insurance, &c., that the margin left to the average farmer would be very small, and much less than the day labourer. I am not speaking of the exceptional farmers —men with large plant and capital, and who secure returns considerably above the average—but the rank and file of farmers, who are obtaining average, or below average, yields.

The ultimate consequences of this condition needs no exposition here, but the only way in which agriculture can be placed on a sound and permanent basis is, that the rewards from agricultural enterprise must be adequate as compared with the rewards for unskilled labour.

It might be asked why, if the profits from farming are so meagre, there are so many rich farmers and retired farmers. If an investigation is made, it will be found that the retired farmers are in one of the following groups:—

1. Exceptional men with large farms.
2. Men who have inherited the farm.
3. Men who have raised large families, and have had an abundance of cheap or unpaid labour.
4. Men who obtained their land in the early days cheap, and have benefited by the rise in land values.

But it might be said, "Why worry about the farmer? If he thinks he can better himself, let him change his business." That is precisely what he is doing in a large number of cases; but is it a good thing for the community? If only a few hundred people were engaged in

farming, we could afford to let it alone, but it is our largest industry, and it is a matter of vital public concern that farmers be prosperous and gradually evolve with the rest of the world.

Among other things necessary for proper development of agriculture, whether from the farmers' point of view or the public point of view, are the following:—

1. Subsidization of country education to such an extent as to insure to every child born on the farm the opportunity of a good primary education, a good high school education, and, if necessary, further education along agricultural, mechanical, or commercial lines, without the necessity of the parent abandoning his home and his business.

2. Public recognition of the fact that the farmer is a representative citizen of our largest and most fundamental industry, and is entitled to an income comparable with his labour, investment, and managerial skill.

3. Recognition of agriculture in all its phases as a matter of deep public concern.

Therefore, all agencies which will assist in developing agriculture and increasing efficiency must receive strong public support. Good country roads, developmenal railways, provision of agricultural credit, conservation of water, extension of irrigation, opening up of new markets, liberal land settlement policies, reduction of marketing costs by more efficient transport, and provision of adequate facilities for agricultural education and investigation, are the most important material factors which will assist in developing our resources and aiding the farmer.

4. A system of agricultural education which will be broad and comprehensive in scope, and which will provide a complete system of investigational work, extension work, and instructional work. A system which will provide—(1) for the training of specialists and research workers in agriculture, whose efforts will be continuously directed to the improvement of country interests; (2) provide for the training of the future farmers; (3) provide, by means of extension or publicity work, for the interests of those who are already settled on the land.

Victoria is the most densely populated State in the Commonwealth, and its future progress depends almost wholly on the development of more intensive forms of agriculture. Each young farmer must produce more wealth from the farm, and secure higher yields per acre or per cow than his father who preceded him. Otherwise, the agriculture of the State must stagnate. Only by increasing the production per farm can the State carry a larger population. But higher production per farm, and the securing of higher yields per acre, requires more skill, more knowledge of crop and livestock production, and higher managerial ability than was required of the previous occupant of the farm.

A properly designed system of agricultural education will provide the technical and scientific knowledge necessary to fully exploit the State's resources.

FIELD TESTS WITH SUGAR BEET.

A. E. V. Richardson, M.A., B.Sc., Agricultural Superintendent.

In order to determine the effect of different varieties, methods of cultivation, and manuring of sugar beet, a series of field tests were undertaken during the past season on an 8-acre field at Boisdale.

The tests were conducted to determine the comparative effects of varying distances of planting, times of seeding, methods of cultivation, and rates of seeding. The influence of fertilizers and the effects of thinning the beet at various stages were also determined.

The field experiments were conducted by the Field Staff in co-operation with the Maffra Beet Sugar Factory, and much credit is due to the Manager (Mr. W. L. Williams) and his staff for their valuable assistance in bringing the experiments to a satisfactory conclusion.

The land selected for the experiments was a deep, black fertile, clay loam, typical of the bulk of the land at Boisdale on which sugar beets are grown.

It was ploughed with a double disc plough to a depth of 9 inches on 8th-15th August, 1919, the plough being immediately followed by the harrow and subpacker. The area was then cultivated with a spring-tooth cultivator, harrowed, and again rolled with a subpacker.

Owing to the dry condition of the land at the time of working, it was worked up in rough condition, but an opportune fall of rain (4.96 inches), extending from 21st to 29th August, assisted in mellowing the soil and breaking down the rough clods.

On 1st and 2nd September the field was cultivated with a spring-tooth cultivator, rolled and harrowed, and seeded in good condition.

The results of the various tests were as follow:—

Table I.—Effect of Varying Distances of Planting on Yield of Sugar Beet.

Plot.	Treatment of Plot.	Running chains of Beet per acre	Sugar Content of Beets.	Yield per acre.
			Per cent.	Tons.
1	Rows 16 inches apart	490	20·3	14·5
2	Rows 18 inches apart	440	20·2	14·35
3	Rows 20 inches apart	390	20·3	12·35
4	Rows 22 inches apart	360	20·5	12·9
5	Rows 24 inches apart	330	19·6	11·7
6	Rows 22 inches and 14 inches alternatively	440	19·3	13·75
7	Rows 16 inches and 22 inches alternatively	415	19·0	14·95
8	Rows 16 inches and 24 inches alternatively	390	20·5	12·7

The plots were uniformly treated with 2 cwt. super. per acre and 12 lbs. seed, and each plot received three cultivations subsequent to sowing. They were sown on 18th August, 1919, thinned on 10th October, and harvested on 3rd April, 1920.

The results appear to show that the highest yield per acre is obtained by seeding in rows from 16 to 18 inches apart, and that as the distance between the rows increases the yield materially falls off,

the yield of the plot sown in rows 24 inches apart being 2.8 tons per acre less than Plot 1. The closer the rows of beets are sown the greater the number of rows of beets and beet plants per acre, and consequently more work is involved in thinning, cultivating, and lifting the beets. On the other hand, the further apart the beets are placed the lower the costs of production per acre. It is obvious that there must be a minimum distance beyond which cultivation with horses would be impracticable, and a maximum distance beyond which yields would be so low as to become unprofitable.

From the results of this experiment it would appear that 18-inch spacing between the rows gives the most profitable yield per acre. The yield is slightly less per acre than the 16-inch spacing, but on the other hand this spacing would mean that there would be 50 chains less beet per acre to thin, lift, and top, and the saving of expense of cultivation would more than counterbalance the decrease in yield.

The results of the test also indicate that there is no advantage in increasing the rows beyond 18 inches, as the tonnage of beet per acre rapidly diminishes as the width of spacing increases.

Time of Seeding Plots.

Eight plots were devoted to time of sowing tests. The plots were sown in duplicate. The effect of the time of seeding on yield and sugar content was thus determined. The results are summarized in Table II.:—

Table II.—Effect of Time of Seeding on Yield of Sugar Beet.

Plot.	Time of Seeding.	Date Sown.	Date Thinned.	Rainfall from Seed to Harvest.	Sugar Content.	Yield per acre.
				Inches.	Per cent.	Tons.
1	Very Early	23.8.19	9.10.19	20·05	19·3	16·05
2	Early	3 9.19	27.10.19	15:17	19·6	14·2
3	Late	30.9.19	20.11.19	13·52	19·6	11·75
4	Very Late	15.10.19	22.11.19	13·19	19·6	10·55

It is apparent that the yield of beet depends to a large extent on the time of sowing. The early-sown beet gave a maximum yield of 16.05 tons per acre, while the late sowings show a progressive decline in yield, the very late sowing yielding only 10.55 tons per acre.

These plots received the same treatment as regards seed and fertilizer allowance, each plot receiving 12 lbs. seed and 2 cwt. super. per acre. The result of this experiment is in accord with experience in sugar beet culture in the Maffra district. In the majority of seasons early-sown beet gives a much higher tonnage per acre than late-sown beet.

Cultivation Tests.

On the plots devoted to cultivation tests the most striking differences in yield were observed. Eight plots were set apart to determine the effect of cultivation on the yield of beets. All plots received the same seed and manure allowance, namely, 12 lbs seed and 2 cwt. super. per acre. One pair was allowed to remain uncultivated after seeding, one

pair was cultivated three times, one pair four times, and one pair six times.

The results are summarized in Table III.:—

Table III.—Showing Effects of Cultivation on Yield of Sugar Beets.

Plot.	Treatment.	Sugar Content.	Yield per acre.
		Per cent.	Tons per acre.
1	No cultivation	19·0	3·55
2	Cultivated three times	19·5	16·9
3	Cultivated four times	19·7	18·85
4	Cultivated six times	19·5	13·65*
5	No cultivation	19·8	3·25
6	Cultivated three times	19·5	13·0*
7	Cultivated four times	19·3	17·25
8	Cultivated six times	18·2	16·9

* Yield affected by weeds growing on adjoining Plot 5 (no cultivation).

The plots were sown on 8th September, 1919, thinned on 29th December, and harvested on 14th April, 1920.

The results of these plots show clearly the value of a reasonable amount of intertilling between the rows of sugar beets.

The two plots left uncultivated gave a yield of 3.25 and 3.55 tons per acre, whilst Plot 2, cultivated three times, gave 16.9 tons, and Plot 4, cultivated four times, 18.85 tons. Further cultivation led to no further increase in yield, the plots which were cultivated six times actually showing a decline in yield as compared with the plots which were cultivated four times.

The yields of Plots 4 and 6 were affected through the excessive growth of weeds on the non-cultivated plot No. 5. These weeds depressed the yield of the outer row of each of the plots adjacent to the non-cultivated plot.

Rate of Seeding Tests.

In these tests the object was to determine the effect of varying rates of seeding on the yield of beet. All plots received 2 cwt. of super. at seeding. The plots were sown on 8th September, thinned on 6th November, and harvested on 17th April. The yields are summarized in the table.

Table IV.—Showing Effect of Varying Rates of Seeding on Yield of Beet.

Plot.	Sugar Content.	Yield per acre.
	Per cent.	Tons.
Weight of seed sown—		
8 lbs. per acre	19·2	15·1
10 lbs. per acre	19·2	16·15
12 lbs. per acre	18·9	16·05
14 lbs. per acre	19·6	16·45
16 lbs. per acre	19·5	15·25

The quantity of seed of any given crop required per acre depends mainly on the vitality of the seed (*i.e.*, germinating power), the tilth and condition of the soil, depth of sowing, and time of seeding. Each of these factors has a marked influence on the "braird" of a cereal such as wheat, barley, and oats. The sugar beet crop, however, is treated somewhat differently from a cereal crop, inasmuch as it is regularly thinned to uniform distances in the rows.

Provided that the soil be in a thoroughly moist condition at seeding, a relatively thin sowing may give as good a yield as a thick sowing. The object, however, to be aimed at is to sow sufficient seed to provide a "stand" which on "thinning out" will leave no unnecessary vacant spaces in the rows.

The plot which gave the highest return, both in yield and sugar content, was that sown with 14 lbs. per acre.

Manurial Tests.

A series of manurial tests were sown to determine the influence of varying types of manure on the yield of beet. The results indicate that manures do not show any marked effect of yield of beet at Boisdale. Probably this is accounted for by the natural richness of the Boisdale soil, which contains, compared with soils in the wheat belt, liberal quantities of all essential plant foods.

The following table summarizes the results:—

Table V.—Showing the Influence of Various Types of Fertilizers on Yields of Sugar Beet at Boisdale.

Plot.	Sugar Content.	Yield per acre.
	Per cent.	Tons.
No manure (average five plots)	18·6	16·3
Super., 1 cwt.	18·6	16·7
Super., 2 cwt.	18·1	17·5
Super., 3 cwt	18·0	17·2
Super., 4 cwt.	19·0	17·55
Super., 2 cwt.; lime, 20 cwt.	19·1	17·55
Basic slag, 2 cwt.	19·6	17·55
Bonedust, 2 cwt.	18·5	17·35
Bonedust, 1 cwt.; super., 1 cwt.	18·5	17·05
Stable manure, 10 tons	18·9	18·2
Stable manure, 10 tons; lime, 10 cwt.	17·9	17·55
Super., 2 cwt.; nitrate of soda, 1 cwt.	18·5	18·2
Super., 2 cwt; nitrate of soda, 1 cwt.; sulphate of potash, 1 cwt.	19·9	17·55

The average yield of five unmanured plots was 16.3 tons. When 2 cwt. of a phosphatic manure was used, in the form of super., bonedust, or basic slag, or a mixture of basic slag and super., the yield was increased in all cases from 1 to 1¼ tons per acre. This, though a small relative increase, is a very profitable increase—the increased return of 35s. to 45s. per acre being obtained at a cost of about 12s. per acre for manure.

The application of lime did not lead to any material increase in yield.

Both nitrate of soda and stable manure stimulated the yields. Stable manure applied alone gave a yield of 18.2 tons. Nitrate of soda, 1 cwt., applied with 2 cwt. of super., gave a return of 18.2 tons, an increase of 1.9 tons over the unmanured plot.

It is clear that the natural fertility of Boisdale lands is sufficient to grow crops of sugar beet without fertilizer; still, the application of phosphates gave a profitable increase of yield in all cases, and the maximum yield was obtained either where a dressing of stable manure was used, or where nitrate of soda was used as a supplement to the super. The average composition of six soils similar to the land on which the experiments were conducted was as follows:—Nitrogen, .232 per cent.; phosphoric acid, .121 per cent.; potash, .150 per cent.; lime, .572 per cent. The percentages of nitrogen and phosphoric acid are very much higher than are found in the average soils of Victoria.

Tests were also made to determine the best time to thin beet. Equal areas of beet were uniformly seeded with 12 lbs. of seed, and thinning was begun one, two, four, six, and eight weeks after germination. The following results were obtained:—

Table VI.—Showing Influence of Time of Thinning on the Yield of Sugar Beets.

Plot.	Date Thinned.	Yield per acre.
		Tons.
1 One week after germination	11.10.19	15·7
2. Two weeks after germination	18.10.19	15·6
3. Four weeks after germination	1.11.19	16.9
4. Six weeks after germination	15.11.19	15.4
5. Eight weeks after germination	29.11.19	11.35

The plot thinned four weeks after germination gave the highest yield per acre. Where the thinning was delayed beyond four weeks, the yield was seriously affected. Beet thinned eight weeks after germination showed a falling off of 4½ tons per acre as compared with beet thinned a month earlier.

A test was made of beet seed raised at Werribee and Maffra (acclimatised and tested seed) against imported French and Russian seed, the latter being used exclusively on the beet areas. The results were as follows:—

Table VII.—Showing Yield of Imported and Acclimatised Seed.

Plot.	Sugar Content.	Yield per acre.
	Per cent.	Tons.
Maffra-grown seed	19·45	17·85
Werribee-grown seed	19·45	17·7
New French seed	18·9	16·9
Russian seed	19·0	16·4

The results demonstrate the superiority of locally bred acclimatised seed over the imported varieties, both in tonnage per acre and in sugar content. The production of superior strains of mother beets is being continued at Werribee, and sufficient seed has been obtained from twelve selected strains from mother beets produced in the season 1916 to sow field tests this year.

Summary.

The general results of the experiments may be summarized as follows:—

(1) In good seasons average yields of 15 tons per acre of sugar beets may be obtained on Boisdale lands.

(2) The yield per acre is greatly influenced by the time of sowing. Beet sown late in August and the first half of September, *i.e.*, early, gave a substantial increased yield over later-sown beet.

(3) The yield of beet per acre was heaviest where the closest spacing, *i.e.*, 16 inches, was adopted, and the yield progressively diminished as the width of rows increased. The most profitable spacing, however, was 18 inches, as a considerable saving of labour was effected without a material diminution of yield per acre.

(4) Successful cultivation of beet is dependent on intertillage. The crop was a comparative failure where no intertillage was given, and the crop increased in yield with each cultivation up to a maximum of four cultivations. Further cultivations could not be given without damaging the roots and tops and depressing the yield. Judicious intertillage had a greater effect in augmenting the yield than any other factor.

(5) The influence of rate of seeding on yields was not marked, there being little variation in yield between the 10 and 14 lbs. per acre. No benefit is gained by increasing the quantity of seed beyond 14 lbs. per acre.

(6) The natural fertility of the Boisdale lands is such that the same striking differences in yield were not observed with artificial manures as are commonly observed in most districts of the State. Still, all phosphatic fertilizers applied at the rate of not less than 2 cwt. per acre gave profitable increases. Stable manure and nitrogenous manures were also profitable. On the other hand, lime and potash appeared to have no effect.

(7) The best time to thin beet appears to be about four weeks after germination. If the operation is delayed beyond six weeks, the yields rapidly decline.

(8) Acclimatised seed gave better yields than freshly imported seed.

SMALL FRUIT CULTURE IN VICTORIA.

(Continued from page 425.)

By A. A. Hammond, Orchard Supervisor.

THE BLACK LOGAN.

This berry was introduced to Victoria several years later than the loganberry. The black logan is also grown under the name of "Lowberry" and "Mammoth."

As there are several distinct varieties of blackberry grown under the name of "Mammoth," it was thought advisable to adapt the name by which this variety is now known to the majority of growers in this State.

The black logan was raised by Judge Logan, at about the same time as the loganberry, and was thought by him to be a cross between the Crandall blackberry and the Auginbaugh dewberry.

It is only during the past few years that the black logan has come into prominence. About twelve years ago a grower, known to the writer, imported this variety from America under the name of lowberry. Having given it a trial in the metropolitan area, and being satisfied with it, he planted a patch in the Gippsland district. The soil and climate being favorable the plants made such vigorous growth that he became alarmed and uprooted the plantation. The same thing happened in the Wandin district, where this variety, which was obtained from a nurseryman under the name of mammoth loganberry, was planted by a commercial berry grower.

It is perhaps well to mention here that there is a real danger in planting unknown varieties of blackberries in the sparsely populated hilly districts, as residents in such localities have learnt by bitter experience. As is generally known there are at least two species of European blackberries growing wild in this State which have proved to be an unmitigated curse. So far, however, the American species have been easily kept within bounds.

In the case of the black logan, however, the alarm seems to be groundless. Some years ago a few surviving plants at Wandin were again cultivated, and the opinion is now held that there is little danger of this variety getting out of hand and becoming a pest.

The black logan is a vigorous grower. Like the loganberry, it is a trailing variety, and roots from the tips of the canes. The canes are stouter and more thorny than those of the loganberry, and attain a length of over 25 feet when planted in suitable soil. The berries are of good quality, jet black, when ripe, sweet, and of large size, measuring sometimes more than 2 inches in length when well grown. The plants are heavy croppers, the yield being considerably more than that of the loganberry. The time of blooming and ripening of berries varies in different plantations. This has given rise to the belief that there may be two distinct strains of this variety. In one plantation the plants bloom about fourteen days before the loganberries, and the berries ripen about fourteen days earlier. Generally it may be said that the time of blooming and ripening coincides with that of the loganberry. The berries of the black logan are more tender than loganberries, and

are not suitable for transport over long distances. They cannot be put to so many commercial uses as the loganberry, but make an excellent jam, and sell readily in the fresh fruit market.

The habit of growth of this variety being similar to that of the loganberry what has been written regarding the propagation, cultivation, and training of the latter applies to the black logan.

Owing to its strong growth, however, it is advisable to set the plants further apart in the rows. This permits of the canes being handled with less difficulty. It also allows room for cultivation. The young canes, which spring from the stool, are very brittle, and are liable to be broken during summer cultivation unless there is ample room for working. It is recommended that the plants be set 6 feet apart, in rows 8 feet apart. This gives 900 plants to the acre.

The following method of ascertaining the number of plants required for an acre will be found useful:—Multiply together the proposed distances between the plants and divide the number of square feet in an acre by the product. For example, if it is proposed to set the plants 8 feet x 6 feet apart, divide 43,560 (the number of square feet in an acre) by the product of 8 x 6, viz., 48. The result is 900, approximately.

Interpollination.

As is well known many varieties of orchard trees are self-sterile, that is, they require the pollen from another variety of the same species to fertilize their blooms. Recent investigations go to prove that self-sterility obtains also among the brambles.

The variety under notice is classed as self-sterile in America, and although our experience in this regard has been limited, there is evidence that the black logan is self-sterile here also. When planting out this variety, growers would be well advised to plant, in juxtaposition to other varieties of blackberry that bloom at about the same time. The early blooms of the lawtonberry would fertilize the late blooms of the black logan, but it would be better to have a variety that blooms simultaneously. Possibly it is owing to want of fertilization of the early blooms that there is such a difference, as previously mentioned, in the time of ripening of the berries in different plantations.

THE LAWTON BLACKBERRY.

The lawton blackberry, or, as it is usually called, the lawtonberry, is like most of our cultivated blackberries, indigenous to North America. In the United States of America hundreds of varieties of different species have been brought into cultivation during the past fifty years. Many of these varieties have been tried in this State, and some are now on trial, but the lawtonberry is the only variety which is grown commercially to any extent. One great advantage with this variety is that there is no danger of its getting beyond control and becoming a pest. Apart from this, it has many good qualities to recommend it. The plant is hardy, vigorous, and very fruitful. It has a wide range of successful cultivation, and is not at all fastidious as to soil requirements. The berries are large and of good quality, and carry well. It was the second blackberry brought into cultivation in America, and, according to American writers, did much to popularize this fruit.

Soil.

The blackberry is probably the hardiest of our cultivated plants, and will do fairly well on rather poor soils varying considerably in character. To obtain vigorous plants and large berries, however, the soil must be good. Nowhere does it thrive better than in a rather strong, well-drained clay loam, fairly rich in humus. The lawtonberry being a late bloomer escapes spring frosts than often destroy the loganberry blooms, consequently, it can be planted in low-lying positions unsuited for earlier blooming varieties. Although, as previously mentioned, the lawtonberry is hardy, it cannot live and thrive in a water-logged, heavy soil. What has been written regarding cultivation and drainage of the soil for the loganberry applies equally to the lawtonberry.

Propagation.

The lawtonberry is usually propagated by means of suckers. These are thrown up from the roots. The number of suckers is increased by cutting the roots, either by deep cultivation or by thrusting a spade into the ground, and making what are practically root cuttings. When young plants are not required, the less the suckering the better for the parent plant; therefore care is necessary to avoid as much as possible interference with the roots. When selecting suckers for planting, it is desirable, always to obtain them from the most fruitful plants.

Planting.

The land having been prepared as advised for the loganberry, plants may be set out at any time from June to August. June planting is recommended, as plants become established during the winter. The distance apart at which to plant depends on the nature of the soil and the system of training adopted. When trained to a stake, and cultivated both ways, the plants should be set about 6 feet apart each way. If trained on a wire trellis, which is the usual system adopted, or between two wires, the plants may be set 4 to 5 feet apart, with 7 to 8 feet between the rows. The advantage claimed by those who favour the stake system of training is, that the land can be cross-cultivated, which does away with a good deal of hand working.

The land having previously been worked to a fine tilth, and marked off, the planting is a simple operation, and can be done with a spade, or by ploughing a deep furrow to receive the plants. They should be set a little deeper than they previously stood, the roots spread out, the fine surface soil placed around them, and firmed with the feet. After planting, plough "on" to the plants, taking care not to work too closely, otherwise the roots may be disturbed. When set out, plants should be cut back to about 4 to 6 inches from the ground.

The subsequent treatment is similar to that required for the loganberry, which has already been discussed.

Training.

The lawtonberry being a strong erect grower the system of training differs from the trailing varieties such as the loganberries. It is necessary, however, that they should be supported, as otherwise when carrying a heavy crop of fruit they would be bent to the ground. Many systems of training are practised, some of which are illustrated in

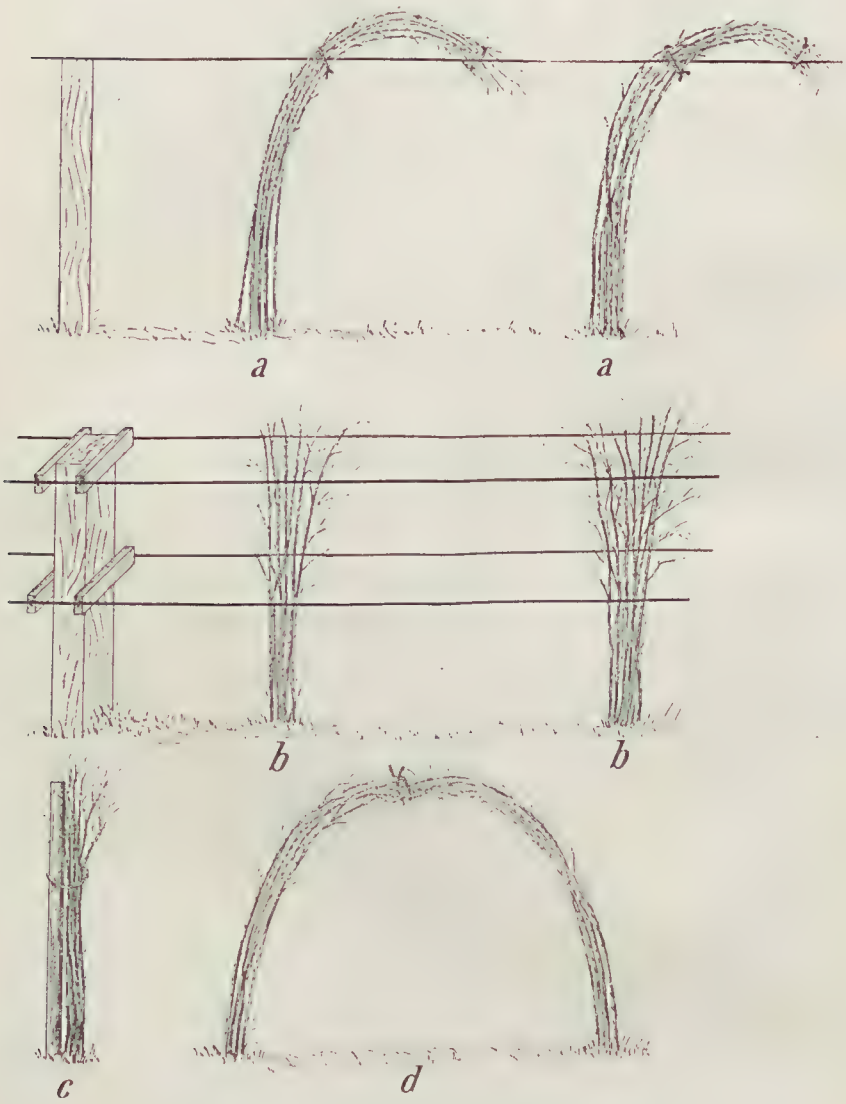


Fig. 10.—Different Methods of Training the Lawtonberry.

(*a*) Canes trained on one wire.
(*b*) Plants trained between two wires.
(*c*) Plants trained to a stake.
(*d*) Canes trained in arches without support.

Figs. 10, 11, and 12. In Fig. 10(*d*) the canes from adjoining plants are tied together, forming an arch. No stakes or wires are used with this method of training. In the other systems illustrated the canes are tied to or held in position by wires, or supported by a single post. In Fig. (*a*) posts are set from 40 to 50 feet apart, and one plain wire, from 4 to 5 feet from the ground, is strained taut and stapled to tops of posts; the canes are tied to this wire. Others, again, train the plants between two wires set at 4 and 6 feet respectively from the ground, as shown in Fig. (*b*). The objection to this method is the difficulty of removing the old canes when cut out after fruiting. These are cut out only once in every three or four years, but this undoubtedly increases the difficulty of harvesting the berries, and the combating of insect pests and fungus diseases. In Fig. (*c*) the canes are shown trained to a post. To save the operator from being scratched by the

Fig. 11.—Lawtonberry Plantation, showing Canes trained in Circles without support.

spines, when tying up canes, it is necessary to wear strong leather gloves. Some growers use old canvas hose to cover the hands and arms, and this seems to answer the purpose very well. Others, again, use a forked and a hooked stick. The brambles are hooked by one stick and pushed by the forked stick into position by one man and tied by another. Constant attention must be given to the growing canes during the early summer. The plantation should be traversed, and the young canes tied up, where necessary, so as to keep them out of the way of the cultivator. The pinching of growing canes, when about 2 feet high, stiffens them, and causes the production of laterals, on which is borne the best fruit.

Pruning.

The amount of pruning required is dependent largely on the vigour of the plant and the system of training. When trained to a stake, as shown in Fig. 10 (*c*), or between wires, the plants should be topped at

mid-summer, when about 5 feet high. The summer topping induces lateral growth. These laterals are shortened back at the winter pruning to from 4 to 8 inches, according to the strength of the lateral. The more severe the pruning the larger the berries; therefore, when a good sample is required for the fresh fruit market, laterals should be cut back to about 4 inches.

The canes of the lawtonberry die after fruiting, and these may be cut out when the berries are harvested, or left till winter, when all the

Fig. 12.—Lawtonberry trained between Wires.

operations of cutting out, pruning, and tying up are performed at the one time. The old canes should be cut out as close to the crown as possible, and all weakly new canes, not required for the coming season's crop, similarly treated. Old canes should be burnt as soon as possible after pruning.

Manuring—Irrigation—Cultivation.

The most successful growers are those who feed their plants well. In specially favoured localities where the soil is rich and retentive of moisture, vigorous plants and good quality berries can be produced

without the aids of manure, irrigation, and cultivation. Such favoured spots are, however, very rare. In most plantations it is found necessary to give the lawtonberry the same care and attention as is required for the loganberry, which has been previously discussed, and need not be repeated here.

Harvesting and Marketing.

Berries should not be harvested until ripe, unless they have to be sent long distances. Berries that have been allowed to ripen on the canes are of much superior quality to those picked immature. However, when the fruit has to be sent long distances quality must be sacrificed, and the berries harvested on the firm side.

It is well to remind inexperienced growers that the fruit is soon spoiled if left standing in the hot sun when picked. The fruit is marketed in punnets or wooden buckets, the containers used depending on the purpose to which the berries are to be put. What has been said respecting the handling of loganberries applies also to this berry.

The time of ripening varies in different seasons. In normal seasons the berries begin to ripen about the middle of December, and continue for three or four weeks.

Early fruit is obtained on strong laterals that have been cut back. Late berries are borne on short, weak laterals. It is important to remember these facts when pruning. By judicious pruning the ripening period is extended, and both earlier and later berries are obtained. From a commercial stand-point this is important.

OTHER BLACKBERRIES.

As previously mentioned, several species of blackberries are grown in Victoria to a limited extent. Some new American varieties have been recently introduced, and are now on trial. It is not proposed to deal with these further than to say that growers would be well advised not to accept all that is said of these recent introductions by those who are interested in their sale. A much advertised blackberry hybrid is said to be a cross between a raspberry, a blackberry, and a mulberry.

Any one having a superficial knowledge of plant-breeding knows that the crossing of two distinct orders of plants is impossible. Seeing that the statement regarding its breeding is so palpably erroneous, growers should accept with great caution the other statements respecting the productivity of the plants and the quality of the berries, &c. The canes and leaves of this plant cannot be distinguished from the common loganberry. Several plants bought at a high price and planted last July will be fruiting during the coming summer, when its value, and possibly its identity can be determined.

Himalayan.—Supposed to be a native of India. The plant is a vigorous grower in the rich soil of mountainous districts, is a heavy cropper, and the berries are large and of good quality. The berries, however, are such poor carriers that it has been found impossible to place them on the fresh fruit market in good condition. It is chiefly for this reason that they are not grown commercially, except in a small way.

Italian (Cut-leaved—Parsley-leaved Blackberry).—This species has been grown commercially to a limited extent in Victoria. The berries are of fine quality, and ripen later than other cultivated varieties. It

is of European origin, and was one of the first blackberries cultivated in the Wandin district. At the present time, however, the chief concern of land-owners is how to get rid of it. Like the common blackberry, it has become a serious pest, and most difficult to eradicate in moist mountainous districts. On no account should this species be planted out. On the other hand, seeing that it is rapidly spreading in some districts, it should, with the species fruticosus, to which it is nearly allied, be proclaimed a pest, and its eradication enforced.

Doubtless there are many species and new varieties of blackberries which have been profitably grown in other countries that would do equally well here. It must be kept in mind, however, that a plant which behaves well in its native country, may become a pest in its adopted country. Therefore, great caution is needed in planting out new kinds, particularly in districts which are specially adapted to the growth of the brambles.

If a variety could be obtained having the virtues of the Italian blackberry in respect to lateness of ripening and quality of berries, and one that could be managed as easily as the lawtonberry, it would be a boon to berry-growers.

CLEANLINESS ON THE DAIRY FARM.

By A. Mess, Dairy Supervisor.

Cleanliness in the cow-shed and separator-room is a matter which, in far too many cases, does not receive the attention it deserves. Of course, cow-sheds and separator-rooms should never be allowed to get dirty; this can only be accomplished by making it a custom to clean up thoroughly as soon as milking and separating operations are finished. Where there is an ample supply of water, and the floor is of concrete or brick, it requires only a few minutes to wash the whole place out. Slab flooring is difficult to keep clean, and when floors consist of natural earth or metal, it is almost impossible to keep them as they should be, though a sprinkling of lime after cleaning will help to keep down any offensive smell.

The manure heap should be, at the very least, fifty yards from the cow-shed. Between milkings, all doors should be left open so as to admit as much air and sunlight as possible. A coating of limewash, at least once a year, will improve the appearance of the walls and assist in keeping down disease in the herd; further, it will help to keep the separator room free from flies.

Washing up the separator and utensils is not a difficult matter if gone about in the right way. Let it always be done as soon as separating is finished; and it must not be forgotten that the task is incomplete until the frame of the separator has been wiped over with a damp cloth, benches washed down, and the floor of the separator room thoroughly scrubbed.

If proper conveniences are provided, it takes less time to do the work well than to half do it where labour-saving devices are absent. A set of brushes, an ample supply of hot water and a tub are required.

Rags for washing dairy utensils are quite useless; they do not get into the corners, and are frequently allowed to become so foul as to be a hot-bed for the propagation of germs. First rinse in cold water everything with which the milk has come in contact; then scrub thoroughly in warm water, in which some soda or other cleanser has been dissolved, and then to complete the operation, scald in boiling water. Leaving the separator overnight without washing after use is a most reprehensible practice. By washing is not meant merely running some hot water through the machine. It should be taken to pieces and each part thoroughly cleansed. If this be not done, slime and dirt will be left steeping in water all night, and germs will be developed, which will contaminate the milk of the morning.

It is a mistake to scour dairy utensils with bath-brick, sandsoap, or metal polish, as these remove the coating of tin from the steel, of which the so-called tinware is made, and cause the steel to rust. If it is desired, however, to give the utensils an extra good scouring, dip a damp brush in some cleansing powder which is not of a gritty nature. Tinware treated properly will look bright and good after years of use: the heat of boiling water will dry it at once, and prevent the formation of rust. Utensils washed in cold water have a dull black appearance, and, if rubbed with the fingers, a greasy smudge appears. A yellow deposit of stale milk will usually be found in the seams, and rust will soon make its appearance. Cream from such vessels cannot be expected to reach the factory in good order, as it is contaminated before it leaves the farm.

With the coming into operation of the Dairy Produce Act, it will pay farmers to take greater care with their cream. An objection frequently made to the grading of cream is that it places at a disadvantage the supplier at a distance from the factory. Experience has shown that such is not the case, as it very often happens that the best cream is received from suppliers so situated. These knowing that, owing to their distance from the factory, care is necessary, take every precaution, while it may happen that the man who has to send his cream only a mile or so, thinks that there is no need for careful treatment on his part.

The following are a few points which the dairyman would do well to remember:—

Don't start milking without first washing hands.

Don't start milking until the cows' udders and teats have been washed in clean water and dried with a clean towel.

Don't use the milk of any cow until she has been calved at least five days.

Don't allow pigs, fowls, or calves in or near the cowshed or separator room.

Don't separate in the milking shed.

Don't use the separator room for a general storeroom.

Don't mix hot and cold cream together.

Don't keep cream in the same room as an oil engine.

Don't make the state of your neighbour's dairy an excuse for neglecting your own.

Always wash cans immediately they come from the factory.

Limewash sheds and separator room at least once a year.

POMOLOGICAL COMMITTEE CONFERENCE.

AT HOBART, APRIL, 1920.

E. E. Pescott, F.L.S., Secretary.

The Sixth Conference of the Pomological Committee of Australia was held at Hobart, Tasmania, in April, 1920.

The members present were:—Messrs. L. M. Shoobridge, J. M. Ward, and Frank Walker, representing Tasmania; W. J. Allen, J. Neil, and A. Goodhew, representing New South Wales; G. C. Savage, representing South Australia; and E. E. Pescott, Secretary, representing Victoria. Messrs. P. H. Thomas and H. A. Turner, of the Department of Agriculture, and Mr. E. H. Wragg, representing the *Fruit World,* were also present. Sir Henry Jones, K.B., attended as a visitor.

The Conference was opened by L. Evans, Esq., Acting Director of Agriculture, who congratulated the Committee on working on lines of correct nomenclature. He suggested that steps be taken to eliminate and discourage numerous varieties not of commercial standard; and that the utility phase of the industry should be developed and encouraged.

Mr. L. M. Shoobridge acted as chairman.

The resignation of Mr. James Lang, J.P., of Harcourt, Victoria, was accepted with regret, and it was decided to place on record the valuable services rendered by Mr. Lang.

The Central Executive of Victoria appointed Mr. J. H. Lang in his father's place. Mr. Lang sent an apology for absence, and suggested that future meetings should be held later, so as not to clash with the work of overseas shipments.

Apologies were also received from Messrs. Geo. Quinn, of South Australia; and J. Boot and F. Chilton, of New South Wales.

Peaches for Canning.

The following is a *résumé* of the discussion on the subject, the chief report coming from Mr. W. J. Allen, of New South Wales:—

Tuscan.—One of the early clingstones, and a good canner; not sufficient information about cropping available.

Pelora.—Ripens with Elberta; considered a good canning peach in California.

Sims.—Spoken highly of wherever grown; has a small smooth stone, and is a good canner.

Gold Dust.—Doing well on heavy soils at Yanko; canning people like it; it will very possibly be a good canner.

Phillip's Cling.—Two varieties were sent out, both good croppers; one is a good canner. The proper Phillip's has yellow flesh right to the stone; this is the better peach.

Golden Queen.—Comes in just before Pullar's Cling and Goodman's Choice; the canning manager at Shepparton speaks highly of it. Mr. Savage says it is one of the most promising of peaches.

Goodman's Choice.—Said by some Victorians to be a good canner; New South Wales does not know it well; it is well worth testing; is highly spoken of by the manager of the Shepparton factory.

Pullar's Cling.—Well known as a heavy cropper; is a good canner and late ripening peach. The Committee fears that it has been planted too largely in some districts.

Elberta.—Not successful as a canner, as modern machinery is rather severe on freestones. It is one of the best cropping and drying varieties, and those who plant it for drying find it pays well. It is not recommended for further planting.

Hawkesbury Champion.—Is inclined to split, late ripening; not recommended.

Plums for Canning and for Prunes.

The following is a *résumé* of the reports and discussion:—

Robe de Sargent and Prune d'Agen.—Are doing well, and making high class dried prunes; d'Agen is the best prune in South Australia.

Angelina Burdett.—Is a good plum, but does not make good prunes in New South Wales. It is a good cropper and preserves well. Precose de Tours and Yellow Magnum Bonum should be planted only as interpollinators.

Coe's Golden Drop.—Makes a good yellow prune in South Australia, but does not bring good prices. Is also an excellent canner. It should be grown in a cool district. Heavy sulphuring is needed to make a good prune. It should be interplanted with either Grand Duke, Green Gage, Coe's Late Red, or Italian Prune for cross-pollination purposes. It bears successfully on new wood, and the older laterals must be cut out to allow for a succession of new laterals for fruit-bearing.

Sugar Prune.—Is good, but large stone is a detriment.

Splendour.—Is also doing well in South Australia, and is a good cropper in certain parts.

Tragedy.—A heavy and regular cropper, is better than Splendour for preserving; it is an excellent garden variety. Jam from prune Tragedy is of the best, and is welcomed by Tasmanian factories.

Italian Prune.—Is a dwarf, bush grower in South Australia without irrigation; it is not a rank grower in Tasmania, but makes good growth and crops well where it gets moisture. There are thousands of acres of this prune planted in Oregon, U.S.A.

Pacific Prune.—Grows well in Goulburn districts, New South Wales; there are trees in there fruiting well at twenty years of age without irrigation.

Jefferson.—Is a leading canner and jam plum in South Australia. It is a heavy cropper, and one of the best all round plums. It is also a good cropper in New South Wales and Tasmania.

Green Gage.—Fruits well in Tasmania, and certain strains are also good in South Australia. Bud selection is needed for the continuance of the strains.

Blue Imperatrice.—Which is synonymous (in Tasmania only) with "Jones' Favorite," is a very popular plum in Tasmania. Sir Henry Jones recommends it as one of the best for jam, drying and canning. It must be thoroughly ripe when used for making jam. It is largely grown at Angastown, in South Australia, for prunes.

Diamond.—Is only good for jam if dead ripe, and it must not be grown too far away from the jam factory.

Giant Prune.—This is not a good prune; it is really only a plum.

President.—A good jam plum.

Grand Duke.—A good jam plum.

It was considered that the last three mentioned plums are good varieties for cool districts in New South Wales, Victoria, and Tasmania.

Blight Proof Apples and Stocks.

The following is a *résumé* of the discussion on this subject:—

Mr. W. J. ALLEN.—In New South Wales, great trouble is experienced in keeping the Woolly Aphis in check. If the Committee would foster the idea, and so find and select Blight Proof Apples, growers would be saved thousands of pounds annually. Seedlings are being tested; what is needed is apples that are equal to the good commercial varieties, and free from Woolly Aphis.

In regard to Mr. Ward's remarks, the situation was possibly well considered regarding Tasmania, but in New South Wales, where the roots are affected, so is the tree, and it becomes worthless for commercial purposes.

Mr. J. M. WARD advocated the use of seedlings for apple stocks. In Tasmania possibly 1,700,000 of the 2,000,000 bushels produced in Tasmania were grown in seedling stocks. Seedlings here have certainly shown the best commercial results.

He had looked into this question when visiting the United States, and found that everywhere from Los Angeles to British Columbia apples were grown on seedling stocks, the seedlings mainly being from Crabs. Professor Wickson advised him that the Northern Spy stock was alright if dwarf trees were needed. He (Mr. Ward) advised the selection of strong seedlings for stock, and buds and scions from approved fruiting trees. In the Hood River District (U.S.A.) the growers will not have trees worked on layers or root grafts. Dr. J. K. Shaw, of Illinois, is working on this question, and hopes to report shortly. He is not altogether satisfied with seedling stocks as a whole, but recommends selection of seedlings. In Tasmania dwarf trees are resulting from the use of the Spy stock, and it would pay better to have larger trees on seedling stocks, even though the Woolly Aphis be found in the roots. In America, seedlings of the Siberian Crab and Malus baccata

were used. He admitted that soil is an important factor, but so is the selection of scions and buds. Aphis was rarely found in Tasmania below 9 inches, and some roots were 2 and 3 inches thick at a depth of 2 feet.

Mr. E. E. PESCOTT said that any one preaching the Seedling Stock in Victoria would find themselves "a voice in the wilderness." Victorians had no fault, from a productive standpoint, to find with the "Northern Spy" stock. The trees so worked grew to be large sturdy trees, which produced heavy crops. On the other hand, Victorians, from past experience, had everything to fear from seedling stocks which were almost always aphis affected. He suggested looking away from the stock question, where trees were not growing or producnig satisfactorily. Possibly the soil or unsuitable soil condition would be an important factor towards unproductiveness.

Mr. A. GOODHEW said that he had imported 20,000 Crab stocks from France. They were strong growers; and were worked and sold to growers, who planted them mostly on light soil in cool districts. The trees have done remarkably well. But the question of the stock has a great deal to do with the soil the trees are planted in.

Mr. C. G. SAVAGE said that in South Australia nurserymen would not sell an apple tree unless it were worked on Spy stock. Growers will not have anything else on account of the Woolly Aphis.

Mr. FRANK WALKER said that it is largely a question of soil. Some soils are absolutely unsuitable for Spy stocks, especially the poor soils.

Subsequently the Committee inspected several orchards, chiefly in the Franklin and Huon Districts, in which the trees growing had been worked on Seedling Stocks.

The following resolution was carried:—

Owing to the serious expenses and losses incurred by fruit-growers throughout Australia, in combating Woolly Aphis on Apple trees, the Australian Pomological Committee recommends to the Australian Conference of Fruit-growers that the several States request that steps be taken to carry out a thorough investigation of suitable stocks for the different commercial varieties of apples, suitable to the soils and climatic conditions under which apples are grown commercially.

Seedling Fruits Submitted—Apples.

Boswell's Pride, raised by Mr. Boswell, of Stanley, Victoria, from Jonathan crossed with Winter Majetin. It is a red apple, and reputedly free from Woolly Aphis. It is to be reported on in 1921 with full information as to cropping. The suggested name is Boswell.

Herbert's Red Rome.—A Rome Beauty sport from Mr. A. B. Herbert, of Diamond Creek, Victoria. The Committee decided that unless it does well in special localities, it is not to be recommended above

Rome Beauty except for its colour, which is a deep red. One word only is suggested as a name.

Cole's Champion, grown in Gippsland, Victoria, reported to keep in an ordinary fruit store till January. The Committee will ask the grower to produce the apples in January for a report.

Northern Spy Sport.—A whole tree was reported to have sported in the orchard of Mr. J. Johnston, Stanley, Victoria, giving small red apples unlike the Spy either in appearance or flavour. The Committee wish for a full report, and for grafts to be tested.

Seedling Apple, from R. E. Pierce, of Belgrave South, Victoria: A good firm apple, to be shown in 1921.

Seedling Apple, from S. J. Kellaway, of Woodstock, Tasmania. This is a chance seedling, well coloured and flavoured. Four apples were submitted from the 1919 crop—over one year old, which were kept in an ordinary fruit shed unwrapped. The Committee considered this to be one of the best seedlings ever submitted, and recommend that close attention be given to it.

A considerable number of seedlings exhibited were examined, and as there were no properties of merit to recommend them above existing varieties, they were not recorded for publication.

General.

(1) It was decided that the decisions regarding Broompark, Eyewood, Black Achan, Black Worcester, and Verulam Pears, as recorded on page 9 of the 1916 Report, and which were interfered with by the war, should now be carried out. The pears will be sent to England for determination in 1921. (2) The next meeting will be held in Melbourne in the autumn of 1921.

SALE OF CATTLE IN SOUTHERN RHODESIA.

In the course of his Annual Report for 1919, the Director of Agriculture for Southern Rhodesia states: "An interesting innovation in the usual methods of selling cattle in this country was initiated in April by the Farmers' Association of Plumtree, and has since proved a most complete success. The association constructed its own stock-yards, dipping-tank, and watering-troughs, appointed an auctioneer, and arranged a series of sales. The cattle are marked, cared for, and taken in charge for delivery by the society, and the fees compare favorably with those of other sales, yet the prime costs have been recovered, and future profits will be used for local public purposes. Other very important advantages are that the local cattle owner, including natives, soon acquire a true idea of the value of their cattle, removing illusions, and helping them to do sound business, whilst if dissatisfied with prices they can take the cattle back to their farms without serious loss. A similar scheme has also been adopted by the Sinoia Farmers' Association, and the plan is worth widespread imitation."

A FARM WELL.

Plans and Specifications.

In the report of the Judge of the Royal Agricultural Society's recent Farm Competition, published in this *Journal* for August last, reference was made to the splendid well, 116 feet deep, on Mr. Robert Blackwood's property at Salisbury. For the following specifications for the sinking of such a well and for the form of contract, we are indebted to Mr. E. A. Kossatz, late Mechanical Engineer to Lowan Shire Waterworks Trust, who also supplied diagrams, &c., from which the plans on pages 608 and 609 have been prepared. An important feature of this well is the provision for an enlarged part called a "chamber" provided with a gravel box. This affords an increased surface for the entry of the water.

SPECIFICATIONS.

The shaft to be sunk truly rectangular and plumb, to be neatly and closely slabbed throughout with 6-inch x 2-inch redgum timber, checked at corners, and battened throughout with 3-inch x 1½-inch redgum or jarrah battens. All batten joints must be made on the centre of the side slabs on which they meet, and secured with two 3-inch nails to each end. All battens to be nailed to each slab with one nail.

At every 20 feet of depth of shaft the two long slabs of one set must project at least 6 inches at each end into the earth wall, ends to be supported on 6-inch x 6-inch x 2-inch chocks of timber to give support to shaft.

The bell of well to be slabbed throughout with 6-inch x 3 inch redgum timbers, checked ¾ inch on face of long slabs, and short slabs to be fitted in between checks. Battens on all corners, and bell to be supported from shaft with eight hoop-iron straps, two to each face of bell. Straps to extend at least 2 feet up the well shaft and downward to the full depth of bell; straps to be punched and nailed to each slab with one 2-inch nail.

The chamber to be slabbed throughout with 6-inch x 3-inch timber checked at all corners, and battens and straps as in bell of well.

The water box to be slabbed with 6-inch x 3-inch checked timbers, but not battened; the space at back of box timbers, covering gravel beam, to be filled with 4 inches of clean gravel if drift is fine.

The gravel beam to be made truly rectangular and neatly fitted at corners. Corners to be secured with two 8½ x ½ inch bolts at each corner. Timber to be 8 inches x 6 inches.

The piles to be made of 6-inch x 1-inch, or 6-inch x 2-inch hardwood timber, 24 inches long; if 6 inches x 1 inch to be neatly tapered 9 inches; if 6 inches x 2 inches, to be neatly tapered for 12 inches; and, in either case, to be nailed on all around the gravel beam as shown.

A collar set of 6-inch x 6-inch redgum to be mortised together, with the ends projecting 12 inches over on to the natural surface.

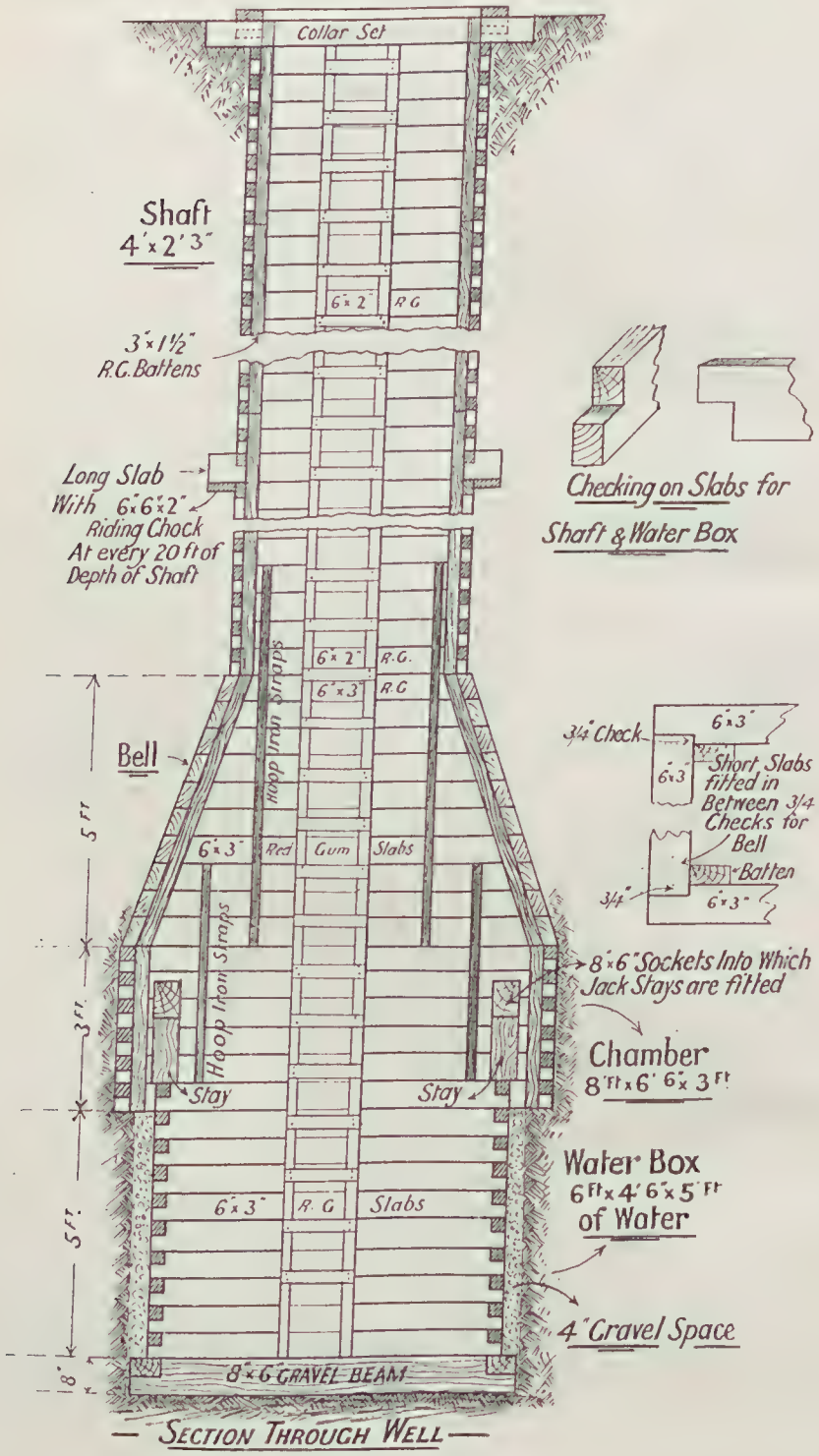
Ladders; styles 3 inches x 2 inches; ladder rungs, ¾-inch piping, 14 inches long, to be let 1 inch into face of style.

Two jack stays of 8-inch x 6-inch timber are to be fitted across the chamber at an even height from the bottom of chamber; the centre of stays to be truly vertical above the centre of water box end timbers.

When the well has been completed, four stays, one at each corner of the water box, are to be fitted between jack stays and box to support chamber and shaft.

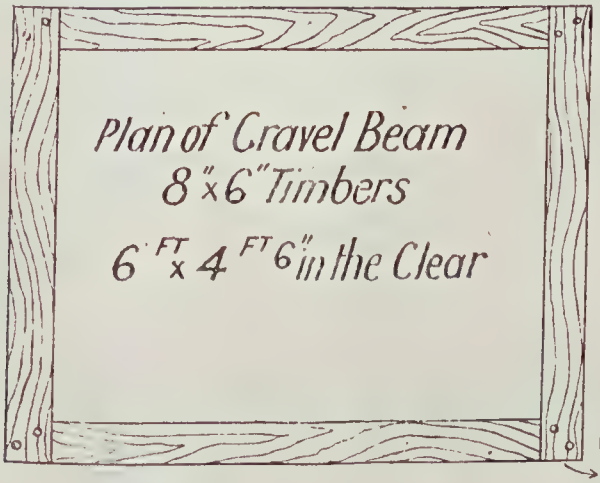
Every care to be taken in slabbing, to see that no cavities are left when finishing, the whole of the work to be carried out in a workmanlike manner to the satisfaction of the proprietor or his deputy.

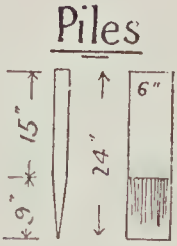
All earth, &c., taken out of the well, to be the property of the proprietor, to be disposed of as he shall direct.



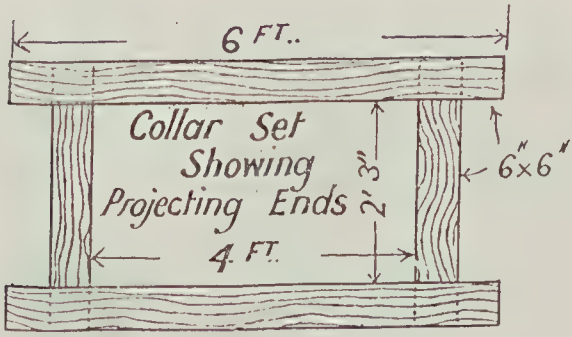
SECTION THROUGH WELL

Piles Nailed Closely around Beam To keep in Position

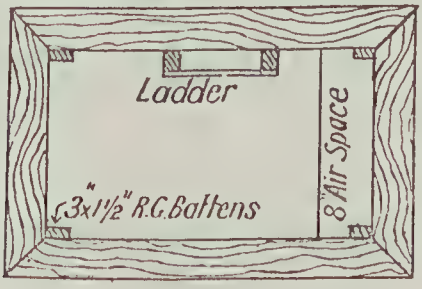




(2) ½" Bolts At Each Corner



Mouth of Shaft With 6"x2" R.G. Mitred Around



CONDITIONS OF CONTRACT.

The contractor to give a price at a rate per foot for both wet and dry sinking to the limit of the proprietor's estimate, but payment shall be made only for work done.

The contractor agrees to find all tools, labour, and appliances necessary for the completion of the works specified, and to deliver same on the site of works free of charge to the proprietor.

The proprietor will find all timber, nails, gravel, and all other material necessary to the satisfactory completion of the works.

The specifications to be the sole property of the proprietor of the works, but they must at all times be made accessible to the contractor.

Progress payments to be made at the rate of 75 per cent. of the price agreed on, according to the work completed.

Time allowed for completion, days.

Proprietor.
Contractor.

Date.....

SPRING GRAFTING OF OLD-ESTABLISHED VINES.

By F. de Castella, Government Viticulturist.

In previous articles (see *Journals* for September and October, 1917) the grafting of young resistant stocks, or field grafting, was described; occasions arise, however, when it is found necessary to graft older vines. There are many different methods, some of which, though most ingenious, are not generally practised. The object of the present article is to describe the more usual ways by which the upper or fruit-producing parts of an old-established vine may be changed to another variety.

Two distinct cases may present themselves. It may be desired—

(*a*) to graft an old vine growing on its own roots, *i.e.*, one which has not previously been grafted;

(*b*) to graft, or more correctly, to re-graft, a vine originally grafted on phylloxera-resistant stock—this may conveniently be termed super-grafting.

The actual operation of grafting does not differ very materially in these two cases. It will be described below; but, before doing so, the general conditions governing each case may be considered.

Grafting Old Vines on their own Roots.

This was the only kind of grafting known in pre-phylloxera days, and before the operation had become the fundamental or basic one it now is. In these fortunate times, before the devastating insect rendered the resistant stock indispensable, vines were, nevertheless, not infrequently grafted. The reasons for so doing being:—

1. To rapidly substitute a more suitable variety for one which it was desired to discard.
2. To transform poor-bearing individual vines into profitable ones of the same variety.
3. To cause shy-bearing sorts to yield heavier crops than when growing on their own roots.
4. To hasten the fruit production of new varieties raised from seed.

For these reasons, mainly, the vine has been grafted since the earliest times. The operation is fully described by writers of antiquity, such as Cato, Varro, Palladius, and Columella.* The last-named gives a very full description of grafting as then practised.

H. Marès, in his remarkable memoir on the vines of southern France,† though written in pre-phylloxera days, devotes considerable attention to grafting, which was extensively practised in some vineyards. He points out that it was a much more common and practical operation in southern France than in the colder regions of the north, where the much larger number of vines per acre rendered it too costly.

> "In the Midi, grafting is a simple and relatively cheap means of re-generating the vineyard without uprooting it, when it is desired to change the variety, to reform faulty vines if such are present, and to rejuvenate the plants, so to speak, when the vines, either too old, or deformed, or damaged by some accident, have ceased to yield sufficiently and seem to have lost their fruitfulness, though still making sufficiently vigorous growth. It also permits the testing of new varieties with the smallest loss of time. Vine grafting thus ranks in the Midi side by side with plantation as a means of maintaining the duration and fruitfulness of vineyards, as well as of improvement of the culture thereof."

He mentions cases in which he had known vines to be grafted at ages varying from 6 to 60 years, the results being equally satisfactory in each. He cites a case reported to him by Cazalis-Allut, of a vineyard grafted when 80 years old which was still yielding good crops 30 years after the transformation.

> "In cases where the vineyard is of advanced age, grafting seems to rejuvenate it. This is, however, in accordance with what is known concerning longevity; the part of the vine above ground becomes old, and deteriorates, but the roots, if in soil of suitable nature, seem indestructible."

Given a favorable spring, a 90 to 95 per cent. "take" was usual. Some of the "misses" were dead, but some could be re-grafted, and dead ones were usually replaced by total layering of a grafted vine alongside the gap to be filled. Two canes were left to the layered vine, one serving for its replacement and the other being brought up in place of the "miss." Marès explains that layering should be delayed until the third year after grafting, by which time the union is sufficiently strong to stand the strain of bending down into the deep trench needed for such total layering.

In Victoria, also, grafting of old-established vines has often been practised on quite a large scale. In Mildura, for example, where numerous vineyards originally planted with wine varieties were transformed to drying sorts when the financial success of sultana and currant growing was sufficiently demonstrated. Many of these vineyards, grafted fifteen years ago, and even earlier, are still highly productive, yielding similar crops to vines of equal age on their own roots.

Sometimes it is desired to change the variety of a large trellised vine trained over a house or pergola. This may occur in suburban gardens where such trellises have often been established with late-ripening varieties unsuited to the Melbourne climate, or sorts which are other-

* *De re Rustica*, by V. M. Columella, written in the first century of the Christian era.

† H. Marès—*Des vignes du midi de la France*—in *Livre de la Ferme*, Vol. 2, written in the sixties of last century. The region known as the Midi is the extreme south of France; it comprises the four Departments of Hérault, Gard, Aude, and Pyrénées-Orientales, which are the leading vine-growing ones of France.

wise undesirable. Grafting permits advantage to be taken of the very powerful root system of the old vine, with the loss of only one fruiting season, since the scion will yield fruit "at the second leaf" (otherwise season) after grafting. Two or three seasons later, the upper part of the vine so transformed will have regained its full size. When grafting such large vines, the disproportion in size between stock and scion is very great, but this does not seem to affect the soundness or durability of the union.

Vines are nearly always grafted below ground,* or so close to the surface that the graft can be covered, until knitting has taken place, by a mound of loose soil. Grafting on exposed arms or branches with wax protection, as practised on apples, pears, &c., though not impossible, is usually so unsatisfactory as to be scarcely practical. An arm of a large trellised vine may, nevertheless, be grafted at any height above ground, all that is necessary is to temporarily maintain some soil around the graft by means of a flower-pot or tin, through the bottom of which the cut-off end of the stock is passed. Knitting still takes place *underground,* or rather under the surface of the small quantity of soil artificially placed around the graft, which must be maintained at the usual degree of soil moisture by occasional but strictly limited waterings. When thoroughly knitted, the protecting soil may be allowed to dry out; a year later it can be discarded altogether.

The European vine (*Vitis vinifera*) may thus be grafted at almost any age. In this respect it differs considerably from resistant stocks which, though quite easy to graft when young, are rather difficult to graft when a few years old.

Affinity Questions.

When grafting vinifera on to vinifera (European vine on to European) it would seem logical to expect that, since stock and scion belong to the same vine species, the greatest measure of affinity would exist between them, and that such grafting should be more uniformly satisfactory than when grafting vinifera on to resistant stocks, in which case, stock and scion belong to different vine species.

Curiously enough, affinity between different vinifera stocks and scions is far from being uniformly satisfactory; and before grafting over a vine to another variety, it is well to inquire if the combination to be made has previously proved to be successful or otherwise. It is to be regretted that the information available is rather meagre, records of the behaviour of different scions on different stocks being scanty. The following instances will, however, show that curious results occasionally follow grafting of vinifera on to vinifera.

The sultana seems to be an indifferent stock, at least, as regards fruit production. Most table grapes grafted on sultanas make good growth, but bear considerably less fruit than on their own roots, or on other stocks.

Raisin des Dames (Bicane) is also an unsatisfactory stock. Sultanas grafted on it grow vigorously, but yield little fruit.

* Budding and the various other forms of herbaceous grafting with green and tender shoots in November and December can be, and usually are, executed without any soil covering, for which reason they are often termed aerial grafts.

The Zante currant, on the contrary, seems to be an excellent stock for most table grapes. The writer has known sultanas grafted on Zante to grow vigorously and yield at least equal crops to some very fruitful sultanas on their own roots alongside.

Centennial* and Woods' Red Muscat† also thrive when grafted on Zante.

The Gordo Blanco Muscat is not a good stock—attempts to transform blocks, originally planted with Gordo, into sultana or Zante, by grafting have generally proved disappointing. Cases are, nevertheless, on record where Wortley Hall, and also Syra (or Shiraz), bore good crops when grafted on Gordo. Especially in the case of Syra, the unions were rather unsatisfactory, and a good many of the vines failed after a few years. It will be remembered that Gordo is a difficult scion to suit with a resistant stock; its behaviour seems similar with vinifera stocks, few of which seem to really suit it. Grafted on Rutherglen Pedro, it grows vigorously, but bears little fruit. It would appear to have poor affinity for most other vines, whether it plays the part of stock or scion.

Many wine grapes are satisfactory stocks. Large areas planted with these in the early days of the Mildura settlement have since been grafted to sultanas and currants, mainly the former. Sultana grafted on the sort known locally as "Baxter's Sherry" was a remarkable success, both as regards growth and yield. On Chasselas, the same scion yielded well, though growth was rather poor. On Riesling, the yield was equally satisfactory, with better growth. Sultana grows vigorously on Mataro, but the yield is lighter. Sultana also does well grafted on Rutherglen Pedro, on the true Pedro Jimenez, and on Syra (Shiraz). It will be seen that the behaviour of the Sultana is far more satisfactory when used as a scion than when acting as stock.

Results are likewise variable when grafting wine grapes on to wine grapes. Cabernet Sauvignon is usually a poor stock, but a good scion. A Cabernet block at Ardmona was grafted with various table grapes, none of which did well. On the contrary, Cabernet grafted on to Riesling, at Bontherambo, did splendidly, yielding very heavy crops. Cabernet on Pinot Meunier (Miller's Burgundy) yields better than on its own roots.

Some combinations may prove to be altogether unsatisfactory—Malbeck on Black Prince, for example—though some of the vines seemed normal many of them started their growth a month or six weeks late, season after season, and bore no fruit. A somewhat similar case came under the writer's notice some years ago, Syra (Shiraz) being grafted on Pinot Blanc. The scion failed to ripen its wood properly, and bore no fruit; and yet Syra is a vine which shows excellent all-round affinity for most resistant stocks.

These few notes will show the great variations in the affinity existing between different stocks and scions, and how previous experience is the only sure guide concerning the success or otherwise of any combination it may be desired to effect.

* Centennial is a large-berried sport of Watham Cross or Rosaki.
† Woods' Red Muscat is a sport of Gordo Blanco Muscat, which originated in South Australia.

Super-grafting or Double Working.

It is sometimes desired to change the variety of a block of vines established on resistant stock, substituting for the scion originally grafted one which is better suited to the district, yields heavier crops or higher grade produce, &c. Malbeck grafted on du Lot has proved a very unfortunate alliance, growing vigorously, but yielding little fruit. Quite considerable areas planted with this combination have recently been re-grafted in the Rutherglen district, the Malbeck scion being replaced by a sort better suited for the du Lot stock. In France, likewise, many thousands of acres have been re-grafted; not infrequently, indeed, vines of certain vineyards have been beheaded and re-grafted several times.

Re-grafting may be performed in two different ways. The vine may be cut off below the original graft and the new scion inserted on the resistant portion of the stem. It may, on the other hand, be cut off at some distance above the first graft, in which case the new scion is inserted on the vinifera portion of the stem. In the latter case, the operation is known in France as "surgreffage," which may conveniently be translated as super-grafting. The stem of a vine so treated will ultimately be composed of three parts, viz.: A, the resistant stock; B, a small length of the first scion variety grafted on to it; and C, the second scion variety, which constitutes the whole of the upper part of the vine.

Super-grafting is usually preferred to grafting back to the resistant stock, for two reasons. In the first place, there is less danger of scion roots, the formation of which would be favoured by cutting off the stock below the first graft, and, therefore, well below the surface level. In the second place, old resistant stocks are notoriously difficult to graft, much more so, in fact, than old viniferas. Knitting is usually much more satisfactory on the vinifera than on the resistant portion of the grafted vine.

In the composite stem of a super-grafted vine, the intermediate portion (the 2 or 3 inches of scion No. 1), far from being a disadvantage, may, in certain cases, be of quite real use. It has even been suggested to turn it to practical account in the case of "bad scions," such as Gordo Blanco Muscat, Mataro, &c., which are notoriously difficult to suit with a resistant stock. Super-grafting renders it possible to interpose a small length of a vinifera variety known to be a good scion between the resistant and the difficult scion, the faulty affinity of the latter being thus overcome. Super-grafting is, in fact, none other than the double working often made use of by nurserymen with a similar object.* Ravaz recently recommended deliberate super-grafting as a means of overcoming tylosis—a physiological disease certain direct producers are liable to when grafted on resistant stocks.†

* As for example with Pear on Quince.—By interposing a short length of pear which thrives on quince it is possible to graft on it varieties of pear which do not otherwise thrive on the quince stock.

† "There is no reason why a second stock, not liable to tylosis, interposed between stock and scion, should not re-establish the harmony which has disappeared. It often happens that a household *à trois* gets on better than one *à deux!* So also with super-grafting, the happy effects of which are well known. It would be a case of interpolating between the direct-producer scion liable to tylosis and the phylloxera-resistant stock, a few centimetres of a vigorous French vine—Alicante, Aspiran, or any other sort. Nurserymen could easily supply us with grafted rootlings *à trois*, and such vines can be obtained by field-grafting."—L. Ravaz in *Progrès Agricole*, 18th April, 1920.

FARMERS' FIELD DAY AT WERRIBEE.

Sir William Irvine Speaks on "Science in Agriculture."

The Annual Farmers' Field Day at the Werribee Research Farm was held on the 24th September, when about 400 farmers and others visited the farm. The visitors were conveyed by special train to the Werribee Station, where they were met by local residents and driven to the Farm. The weather was very unfavorable, and it was in heavy rain that a few words of welcome were spoken by the Director of Agriculture. The party then broke into sections, about half, including His Excellency the Lieutenant-Governor, Sir W. H. Irvine, electing to accompany Mr. Richardson, Agricultural Superintendent. A tour was made of the lucerne and cereal fields, and the stud Border Leicester and Suffolk sheep were inspected on the way. A number of demonstrations and lecturettes on crop rotations, irrigation experiments, lucerne culture, cereal improvement, manurial tests, and the top-dressing of pastures and on the rearing of sheep on the farm were given by Mr. A. E. V. Richardson, Agricultural Superintendent, and Mr. H. C. Wilson, Farm Manager. The remainder of the visitors sought shelter in the farm buildings, where a couple of talks on the breeding and feeding of cows were given by Dr. Cameron.

On the return of the party from the field, afternoon tea was served in one of the barns. After tea, the Minister of Agriculture (the Hon. D. S. Oman, M.L.A.), asked His Excellency the Lieutenant-Governor to address the company. Having thanked the Minister for his kindly welcome, His Excellency said:—

You have all heard it said that the farmer is never satisfied, especially with weather conditions, but the clerk of the weather has surely satisfied him this year. I must express to Dr. Cameron and those associated with him my congratulations on the excellent order of the farm and the useful work they are accomplishing.

Though for many years I was associated with farmers in the North-West, and later in Gippsland, I would not pretend to express an opinion on the things we have seen nor the lectures we have heard from Mr. Richardson. I could not help thinking as I looked on the faces of those around me that what was in the mind of most of Mr. Richardson's listeners was this, "These experiments are extremely interesting, but do they apply to my particular farm?" For all time farming has been an art. In older countries agriculture was an art based upon the experience of centuries, handed down by tradition from father to son. The old class of farmer followed methods found suitable, and these were applied by generation after generation. Even now three parts in four are the practical experience on the farm, but the other part is becoming more and more important, and the art of agricultural science must subtend a wider angle. Such matters as the treatment of soils and the raising of new cereals are as the years go on becoming more essential, and it may be that they constitute one-third of farm practice.

The young men of to-day have to remember that when their fathers began farming land was more easy to obtain. Now more capital is required, and in order to pay interest on that capital it is becoming increasingly necessary that farmers should have some slight knowledge

of farming distinct from traditional methods. Of course, they cannot be scientific experts, but, as a community of farmers, they require that the highest scientific knowledge from that of the University theorist down to the various experts, who are reducing his theories to practical use, should be made available to them. In this way the work on the Werribee Research Farm is playing an important part in the development of agriculture. (Applause.) We are years behind the world in these matters, and are half asleep in this garden of Victoria. Other countries are advancing in scientific theory in the cultivation of the soil, and we must keep pace with them.

As this is a gathering of representatives from all parts of the State, perhaps I may press the claims of our University, and let me say that a University is not, as so many people think, a place where young men are taught to make money, but rather the centre of concentrated thought and research.

The worst economy that a man can practice in his physical existence is to cultivate his muscles and starve his nerve centres, and that is what we as a nation, have been doing. The Government, recognising that if Victoria is to advance, we must spend money on the highest centre of theoretical thought, has passed an Act allotting £14,000, and a further £100,000 to be paid in ten annual instalments. This, you will agree, is not overwhelmingly generous; it is paltry when compared with the endowments of £500,000 recently allotted for rejuvenating the Universities of Manchester and Birmingham. However, it is a beginning, and, of course, the Government cannot do much unless it has the support of the people. I therefore urge farmers of all parts of Victoria to press the claims of scientific agriculture. The fruit of some of the experiments we have seen on this farm are not of to-day or to-morrow; they will be gathered by our children. The science of agriculture must go on, and it is not right simply to receive benefits from it; it is your duty to give whole-heartedly to support it. (Applause.)

In thanking the Lieutenant-Governor for attending, the Minister of Agriculture said:—

Owing to the bad weather you are glad to stay under cover, and this is consequently a good opportunity for a speaker. (Laughter.) However, I intend to say only a few words.

I am singularly fortunate in many of the officers of the Department which I administer, but, unfortunately, many of the men who should come from the University to help in the agricultural development of the State are not available to us. At the beginning of the war almost all the graduates in agriculture volunteered, and of these two-thirds were killed. Of the remaining one-third most were offered remunerative positions elsewhere; some, I am glad to say, were loyal enough to refuse such offers, and accepted service with us.

Of our Research Farm here we are especially proud. Notwithstanding that the work carried on is mainly experimental, during the last two years the farm has shown a small profit, and the average annual loss to the State during the past seven years has been only £1,331. Such a result is highly creditable to Mr. Wilson, the Manager of the farm, as well as to Mr. Richardson, the Agricultural Superintendent, a man in whom, I know, the agricultural community has every confidence.

It is rather difficult to avoid introducing politics, but you will, perhaps, overlook this when I tell you that I have scarcely been able to leave my Department to do any electioneering. I need hardly say that the Government is wholly in sympathy with the farmer. The Treasurer has said over and over again, "I stand behind the primary producer, and will provide whatever money is necessary." Last year, when your fields were bare and your flocks large, the Government arranged for an advance to be made to you of three-fourths of the value of all sheep slaughtered and placed in cool storage, and thus made it possible for you to tide over a most difficult period. We have entered into huge expenditure to enable the fruit-grower to store his fruit, and so prevent an over-supply in the markets in the flush of the season. During the coming season there will be a harvest of from 40,000,000 to 50,000,000 bushels of wheat, and we are now trying to arrange for its shipment.

At all times we have tried to conserve the interests of the man on the land and to encourage production, and by this means insure the prosperity of the State.

NOTES ON EXPERIMENTAL WORK AT THE STATE RESEARCH FARM, AUGUST AND SEPTEMBER, 1920.

By George S. Gordon, Science Field Officer.

Seasonal Conditions.

The weather during August was mild and showery, with slightly rising temperatures, and little or no frost. A steady soaking rain, amounting to 146 points, fell at the end of the third week, making a total of 276 points registered for the month. Further mild rains, totalling 347 points, occurred on seventeen days during September, and brought the rainfall for the first nine months of the year up to 14.38 inches. Of this amount, over 5 inches fell during the past six weeks.

Result on Crops.

The fine rain and favorable conditions have materially benefited the crops in the various experimental fields, and, with the exception of small depressions on clay soil where the plants are suffering from excess of water, they are making excellent growth, any variation in appearance being generally attributable to the cultural treatment which the particular plot received or the inherent characteristics of the variety of crop grown. The early-sown crops on the whole, and particularly wheat, have come through the cold, dry winter much better, and are further advanced in growth than the later-sown ones. This is particularly noticeable in the Stud Cereal Field, where the seeding of 3,000 odd plots by hand extended over a period of six weeks from the end of April to the middle of June. Most of the observations made during July regarding the appearance of different sections still hold good, but the following notes may be added.

Permanent Rotation Field.

The outstanding plots of merit in this field are still those which were fallowed in 1919, and the worst are those on which the same crop

is grown each year. The "Wimmera" rye grass which was sown on last year's pasture plots made a fairly strong attempt to re-establish itself from the edges of the plough sods, or slices which were turned over when the plots were fallowed this year. This growth was nearly all destroyed by a springtooth cultivator; but the showery weather probably helped some plants to survive, and further cultivation has been found necessary to maintain the surface in good fallow condition.

The field is badly infested with a weed known as Hoary Cress, and despite cultivation, it has made a particularly strong growth this year, and a consequent reduction in yield may be expected from the plots on which it is established. Sections where the weed is very bad have been sprayed with a solution of bluestone and nitrate of soda to test the efficacy of this mixture as a means of eradicating the pest.

Green Manurial Rotation Field.

With the exception of the rape plots, the whole of this field is looking well. The plots of barley and oats to be ploughed in this year are ready for turning under, but the rain has kept the soil too soft to carry the horses. In the "fed off" section, the first feed has been completed on the barley and oat plots, with the following result:—

Plot No.	Crop 1920.	Area.	No. of Sheep.	Days on Plot.	Result Per Acre.	
					No. of Sheep for one day.	Live Weight Increase.
		acres.				lbs.
2	Barley.. ..	·95	6 6	28 18½	293	168
4	Algerian Oats ..	·95	5 4	28 12	218	96

The sheep were removed from the oat plot before it was quite eaten off in order to give it a better chance to produce a second feed, and also because the sheep would have puddled it had they been left on during the rain which fell at the time. Both these plots have since made a rapid growth, and have again been stocked with sheep.

Lucerne and Irrigation.

The winter renovation and top-dressing of the experimental lucerne plots has been completed, and a commencement has been made with the construction of a concrete channel in connexion with a new series of plots which have been designed and set out to test various matters relating to irrigation and lucerne culture. On these plots, the first "cut" for the season is almost ready for harvesting.

"Selection" Wheat Plots.

All these plots are growing vigorously and looking well, though considerable difference in the growth of even adjoining plots is apparent.

These differences are, however, normal and characteristic of the varieties under observation, and it does not necessarily follow that the best looking plot at present will give the greatest yield at harvest. Early-ripening varieties generally make a rapid, early, and erect growth, while late ones make their greatest growth at a more advanced stage. A new cross-bred (W4322C—1. Hard Federation x Canberra) is probably the most forward and attractive plot at present, being quite as tall as early-maturing varieties, such as Gluyas and College Eclipse; but it is much better stooled, and has a nice erect foliage of a darker green colour than the varieties mentioned. Another cross-bred (W4796E. Penny x Canberra) which gave considerable promise as an early variety, with good straw and grain-holding qualities, and yielded remarkably well as a third generation selection in 1919, is now heading out, and though somewhat thin, it again looks well. Federation, Selection No. 9, is also a very nice plot in both this section and the larger "seed" or ½-acre plots. Another Federation cross-bred—white in colour—is a very promising plot. The new wheat Gallipoli, which has given such good results in past years, and has this year been distributed in fairly large quantities to a number of growers in the wheat belt, is strong and vigorous, but at this stage it is not so attractive as the plots mentioned above.

Sugar Beet Improvement.

In 1917, 200 selected sugar beets were tested and re-sown as mother beets at Werribee, and from these the twelve best strains have been isolated. These twelve strains or selections were grown in bulk last year, and the seed from each has been forwarded to the sugar factory at Maffra for testing in larger areas. They originated from mother beets which not only contained a high percentage of sugar, but which, apparently, transmitted this characteristic to their progeny, and at the same time gave a good yield of beet. Descriptions, weights, sugar percentages, and other particulars relating to these selections have been kept during the period 1917-1920 inclusive, and the records of their sugar content are given in the following table:—

Mother Beet No.	Sugar Content.	Average Sugar Content of Progeny (four samples).
	per cent.	per cent.
20	15·4	17·9
26	15·6	19·0
63	16·0	18·8
82	19·2	19·1
92	18·2	19·1
98	14·4	19·6
102	17·0	19·2
108	16·4	19·3
154	19·0	19·3
155	16.8	19·8
183	19·2	19·1
187	18·8	20·3

HEN'S PLUMAGE CHANGES TO THAT OF MALE.

The following interesting note has been supplied by Mr. W. C. Rugg, Poultry Foreman, Werribee Research Farm:—

The somewhat rare instance of a hen with the plumage of a cock occurred at the poultry-yards of the Werribee Research Farm.

This Leghorn hen was hatched at the Government Farm, Wyuna, in August, 1917, and started to lay in February, 1918. When placed on 1st March in a single pen for testing, she went into a false moult, and did not lay again till the end of March. She then laid 217 eggs for the eleven months ending 28th February, 1919. She was brought to Werribee, and in the breeding season following, produced only 9 eggs, none of which proved fertile.

After last autumn's moulting, her appearance was entirely changed, her new plumage resembling that of a male bird. Her comb became erect, she grew long, thin hackle feathers on the neck and across the saddle, and also grew a full tail, as may be seen in the accompanying illustration.

It is stated by Mr. Raymond Pearl, of the Agricultural Experiment Station, State of Maine, U.S.A., that this change of plumage is caused by a disease known as atrophy of the ovary, and that there is no known way of treating it. Such cases, when they occur, must be accepted by the poultryman as one of the vicissitudes of the business.

For observational purposes, this bird was sent to the Veterinary School at the University, where she died. By holding a *post-mortem*, Mr. Seddon discovered that practically the whole of the abdominal cavity was occupied by an enormous cyst, which was attached to the remains of the ovary. The ovary, as such, had disappeared, and was

replaced by a mass of new growth (tumor), the cyst being simply an extension or portion of this.

Though this abnormality is uncommon in Australia, it is well known in older countries. In England, as far back as the year 1858, it was noticed in pheasants, more especially when these birds were reared under domestic conditions, *i.e.*, on the present system of breeding pheasants in preserves.

A WOOL CALENDAR.

1298 .. The price of a sheep at Scarborough, in Yorkshire, was one penny

1442 .. Birth of Columbus—son of a Genoese wool-comber.

1566 .. Export of sheep from England prohibited.

1660 .. Export of British wool prohibited. (The ban remained until 1825.)

1706 .. In or about this year was established the first woollen mill in New England (U.S.A.). Stuffs, kerseys, linsey-woolsies, and flannels were being made there in 1715.

1734 .. Ossett weavers worked fifteen hours a day for 8d.

1737 .. Manufacturers petition Parliament to forbid the exportation of unmanufactured wool.

1787 .. Pitt imposed prohibitive tariff of 37s. 5d. per yard on woollen cloth imported into England.

1792 .. A carding engine illicitly exported from England erected in the United States.

1803 .. Import tax imposed of 4s. 8d. per cwt. and 12½ per cent. (approximately 5s. 3d.) on wool entering Great Britain; a consignment of merino wool brought from Australia to England by Captain Macarthur.

1813 .. British import tax on wool raised to 6s. 8d. per cwt.

1816 .. Import duty on foreign wool 6d. per lb. and on Colonial wool 1d. per lb.

1825 .. British tariff on foreign wool value 1s. per lb. and upwards reduced to 1d., and on wool of less value to ½d.; Colonial wool added to free list.

1838 .. There were in England 415 worsted mills, with 282 engines developing 5,863 h.p.; 114 were supplied with water-power. The mills engaged in all 31,606 persons.

1852 .. First power loom at Wellington.

1877 .. The first woollen mill open in Japan.

1879 .. High tariff imposed in Germany.

1890 .. McKinley Bill passed in U.S.A. Baring crisis.

1911 .. High tariff imposed in Japan.

Extracted from Report of the Director, Bureau of Commerce and Industry, on the Woollen Manufacturing Industry.

STALLIONS REGISTERED FOR 1920-21,

under the Horse Breeding Act.

Registrations prior to 24th September, 1920.

Cert. No.	Name.	Age.	Class.	Owner.	Address.
		Yrs.			
289	Abbey	A.	Light ..	Harricks Bros. ..	Ararat
290	Abdulla King ..	A.	Pony ..	E. Stevens ..	Pranjip
16	Abbotsford ..	A.	Draught ..	McGregor Bros.	Rochester
619	Abbotsford Champion	A.	,, ..	C. Elphick ..	Woorarree West
291	Aberdeen	A.	Light ..	J Troup ..	Coghill's Creek
292	Admiral Sperry ..	A.	Draught ..	A. Duff ..	Baringhup
673	Advance	A.	Light ..	L. C. O. Smith ..	Merbein
674	Adventure ..	3	Pony ..	C. H. Waters ..	Corryong
17	Agitator's Heir ..	A.	Draught ..	T. Hallinan ..	Kerang
334	Aird Laddie ..	A.	,, ..	E. Yeaman ..	Echuca
293	Albion	A.	,, ..	J. Oakes ..	Nathalia
294	Alborak	A.	Light ..	T. McCarthy, jun.	Merbein
543	Alister	A.	,, ..	J. Williamson ..	Newry
74	All Scotch ..	5	Draught ..	J. Elliott and A. Dickens	Tatura
659	All Style	A.	Light ..	R. Matchett ..	Bendigo
635	Almont M. ..	A.	,, ..	J. Minns ..	Melton
97	Almort's Pride ..	A.	,, ..	Downie Bros. ..	Longwarry S.
295	Angle Jack ..	A.	,, ..	C. F. Hillas ..	Tallangatta
539	Antonius	A.	Thoroughbred	H. Macguire ..	Stratford
67	Argyle	A.	Pony ..	R. Trimble ..	Rutherglen
236	Ashville Lad ..	6	Light ..	G. Inglis ..	Tallygaroopna
296	Attraction's Champion	A.	Draught ..	W. Morley ..	Rutherglen
133	Avonlea	5	,, ..	J. Leitch ..	Wodonga
156	Axedale Prince ..	4	,, ..	J. G. Bunworth ..	Donald
100	Bally Golly ..	A.	Pony ..	T. C. Maidment ..	Moyston
203	Bally Leigh ..	A.	,, ..	J. T. Carroll ..	Molka
297	Baron	A.	Draught ..	M. Murphy ..	Rupanyup
135	Baron Again ..	3	,, ..	Gillis and Walter	Werribee
299	,, Asquith ..	A.	,, ..	D. L. Bodey ..	Jung
298	,, Bombay ..	A.	,, ..	Shiels Bros. ..	Youanmite
238	,, Bill ..	3	,, ..	P. H. Müller ..	Dimboola
300	,, Brilliant ..	A.	,, ..	Wyatt Bros. ..	Rainbow
160	,, Faithful ..	5	,, ..	D. Barry, jun. ..	Culgoa
301	,, Fenwick ..	A.	,, ..	H. C. Wilson ..	Raywood
302	,, Fenwick ..	A.	,, ..	A. J. Richards ..	Strath Creek
303	,, Juno ..	A.	,, ..	W. T. Manifold	Camperdown
687	,, Laddie ..	A.	,, ..	A. McLennan ..	Derrinal
36	,, Leigh ..	6	,, ..	Meer Khan ..	Modewarre
44	,, May ..	3	,, ..	A. G. Hunter ..	Seymour
304	,, Milford ..	A.	,, ..	P. Eagle ..	Horsham
288	,, McLeod ..	A.	,, ..	R. Kerr ..	Yering
46	,, McLean ..	A.	,, ..	D. W. Stewart ..	Logan
38	Baron's Heir ..	A.	,, ..	T. J. Hansen ..	Barnawartha
307	,, Pride ..	A.	,, ..	V. J. Lanfranchi	Cowangie
713	,, Reserve ..	A.	,, ..	G. J. McCabe ..	Gerang
213	Baron Rosebery ..	3	,, ..	S. Clemens ..	Serpentine
308	Baron's Royal Chief	A.	,, ..	T. E. Parry ..	Coonooer Bridge
523	,, Superior ..	5	,, ..	C. T. Walker ..	Trafalgar East
305	Baron Stanley ..	A.	,, ..	W. M. Rowan ..	Edgecombe
35	,, Stewart ..	5	,, ..	J. W. Hansen ..	Baulkamaugh North

STALLIONS REGISTERED FOR 1920-21—*continued.*

Cert. No.	Name.	Age.	Class.	Owner.	Address.
		Yrs.			
522	Baron Style ..	2	Draught ..	J. Browne ..	Werribee
306	,, Watson ..	A.	,, ..	W. T. Manifold	Weerite
210	,, Wattie ..	3	,, ..	H. J. Jackman ..	Tandarra
335	,, Wigton ..	A.	,, ..	State Research Farm	Werribee
309	Barony	A.	,, ..	E. C. R. Spedding	Bealiba
338	Battarlons ..	A.	Light ..	T. Skelly, jun. ..	St. Arnaud
339	Bawnmoor ..	A.	Thoroughbred	J. Kelsey ..	,,
130	Beaconsfield Flyer ..	A.	Light ..	W. A. Syme ..	Eldorado
211	Beau Brummel ..	5	,, ..	J. Scott ..	Neilborough
647	,, Cheval ..	A.	,, ..	H. J. Jefferis ..	Wangaratta
688	,, Gallant ..	A.	,, ..	J. Dunlop ..	Birregurra
524	Beechwood ..	A.	Thoroughbred	H. C. Owens ..	Laverton
32	Belle Boy ..	A.	Light ..	R. V. Danson ..	Somerville
110	,, ,, ..	A.	,, ..	A. G. Turnbull ..	Horsham
56	,, ,, Voyage ..	3	,, ..	S. J. McKay ..	Mitiamo
661	Belmain	A.	Draught ..	L. McLeod ..	Toolamba
525	Belmont Again ..	3	,, ..	W. A. Creighton	Alexandra
105	Berkeley Bantam ..	5	Pony ..	R. Crozier ..	South Morang
47	Berra Bach ..	A.	,, ..	Bryce and Dunn	Mitchell Hill
111	Bickie	A.	Light ..	A. G. Turnbull ..	Horsham
214	Billy Briton ..	3	Pony ..	A. Sweeney ..	Kennington
340	,, Mac	A.	Light ..	A. G. Wilson ..	Shepparton
102	Blackbird	3	,, ..	D. W. Heaney ..	Benalla
264	Black Steel ..	A.	Thoroughbred	J. K. Shepherd ..	North Melbourne
255	,, Tom ..	A.	Light ..	A. Potter ..	Camperdown
34	Blacon	6	Draught ..	A. McNeil ..	Warragul
710	Bladnock	A.	,, ..	D. Blair ..	Terrappee
582	Blue Wilkes ..	A.	Light ..	J. A. McNeill ..	Weering
341	Bob Ash	A.	,, ..	T. Moore ..	Kialla East
279	Bobby	4	Pony ..	G. Officer ..	Woolsthorpe
204	Bobniak	A.	Light ..	H. F. Clarke ..	Miepoll
6	Bob's Fancy ..	A.	,, ..	T. Lee, jun. ..	Mulwala
342	Bogandyera ..	6	,, ..	J. Hargreaves ..	Eskdale
68	Bold Acton ..	5	Draught ..	E. Pearce ..	Rupanyup
75	,, Alex.. ..	4	,, ..	McClelland and Gillett	Lara
310	,, Baron ..	A.	,, ..	H. Jackman ..	Tandarra
591	,, Boy.. ..	3	,, ..	Fitzgerald Bros.	Adelaide
146	,, MacGregor ..	A.	,, ..	A. F. Fordham ..	Walpeup
77	,, Newton ..	4	,, ..	Hehr Bros. ..	Woolert
583	,, Rowan ..	A.	Light ..	J. W. McNeill ..	Weering
24	Bonnie	3	,, ..	W. Chynoweth ..	Swan Hill
61	,, and Braw ..	3	,, ..	A. Scott ..	Elmore
311	,, Belmont ..	A.	Draught ..	W. Williams ..	Strathmerton
312	,, Brae ..	A.	,, ..	King Bros. ..	Kinnabulla
62	,, Mac ..	4	Light ..	T. G. Charity ..	Serpentine
137	,, Scotland ..	A.	Draught ..	S. L. West ..	Coreen, N.S.W.
343	,, Voyage ..	A.	Light ..	Busst and Glasheen	Huntly
18	Booringa	A.	,, ..	T. J. Hansen ..	Barnawartha
541	Boro Cashier ..	A.	Draught ..	K. A. Domaschenz	Rainbow
683	,, Sportsman ..	A.	,, ..	E. A. Noltke ..	Merino
171	Bower Bank ..	A.	Light ..	J. O'Bree ..	Piangil
313	Bramhope Forester	A.	Draught ..	E. Parish ..	Horsham
544	,, Jack ..	4	,, ..	A. Clark ..	Bundalaguah
314	,, Paladin ..	A.	,, ..	W. H. Alford ..	Modewarre
545	,, Samson ..	A.	,, ..	A. Dean ..	Tinamba

STALLIONS REGISTERED FOR 1920–21—*continued.*

Cert. No.	Name.	Age.	Class.	Owner.	Address.
		Yrs.			
248	Breadwinner ..	A.	Light ..	E. Prime ..	Echuca
34	Breakfoot ..	A.	,, ..	T. R. Anderson ..	Bundalong S.
315	Breastknot ..	6	Draught ..	W. J. Moll ..	Dimboola
205	Brigham Again ..	A.	Pony ..	J. Burns ..	Euroa
715	Bright Bells ..	4	,, ..	S. R. Ritchie ..	Thomastown
316	Briton Again ..	A.	Draught ..	R. Trimble ..	Rutherglen
532	,, Pride ..	A.	Pony ..	G. Kenworthy ..	Ballarat East
164	Bronte's Pride ..	4	,, ..	W. A. Jones ..	Dumosa
714	Brooklyn Junior ..	A.	Light ..	J. W. Murchison ..	Dunbulbalane
531	Bucklyvie's Choice ..	5	Draught ..	Gillis and Walter	Werribee
597	Bundoran ..	A.	Light ..	A. Graham ..	Bacchus Marsh
632	Bundoora Black Leigh.	3	,, ..	Miss B. B. Reid	Bundoora
317	Bute Laddie ..	6	Draught ..	Crawford Bros. ..	Tatura
345	Cacique	A.	Thoroughbred	J. H. Templer ..	Nhill
280	Calais	6	,,	G. Officer ..	Woolsthorpe
181	Caledonia	A.	Draught ..	Withers Bros. ..	Bobinawarrah
318	Calland Dale ..	6	,, ..	J. E. Hooper ..	Devenish
7	Candidate Menestral	4	,, ..	T. Long ..	Nhill
618	Cannoneer ..	A.	Light ..	J. J. Morgan ..	Devon North
521	Cape Sky	5	Thoroughbred	G. Buckley ..	Flemington
72	Capitalist	4	Draught ..	A. G. Adams ..	Bungowannah
689	Captain White ..	A.	Thoroughbred	C. Mitchell ..	Bruthen
368	Carman	A.	,, ..	J. W. P. Prendergast	Benambra
546	Carovita	A.	Pony ..	M. Cantwell ..	Cowwarr
348	Carwelkin ..	A.	,, ..	T. Spillane ..	Williamstown
350	Cathedral Chimes ..	A.	Light ..	A. E. Carter ..	Guildford
119	Chenard	3	,, ..	W. T. Carter ..	Coleraine
675	Chidley	A.	Pony ..	Executor late W. E. Mitchell	Corryong
150	Child Abdallah ..	A.	Light ..	R. Beyer ..	Footscray
14	Cimbric True Blue ..	A.	Pony ..	J. W. Lindan ..	Warragul
706	Clan Newton ..	4	Draught ..	S. J. Lynn ..	Orbost
136	,, Stewart ..	3	,, ..	J. R. Stokes ..	Ballarat
351	Clarion	A.	Pony ..	W. H. Thompson	Yalca
319	Claymore	A.	Draught ..	J. Hiskens ..	Rutherglen
352	Clem	A.	Pony ..	M. Skeyhill ..	Weerite
157	Clyde's Fancy ..	2	Draught ..	W. R. Pope ..	Donald
690	Cock Robin ..	A.	,, ..	A. D. Redenbach	Tambo Upper
221	Coliban	6	,, ..	W. Todd ..	Taradale
13	Colonel Dale ..	A.	,, ..	T. F. Major ..	McMillans
320	,, Young ..	A.	,, ..	H. W. Oberin ..	Goornong
201	Comet	A.	Pony ..	G. Plummer ..	Murchison
321	Commander ..	A.	Draught ..	A. Simon ..	Huon
256	Commodore Nut ..	A.	Pony ..	W. T. Manifold	Weerite
685	Commonwealth ..	A.	Light ..	H. Mathieson ..	St. Helens
529	Connie All Style ..	3	,, ..	T. J. Sheppard ..	Willowmavin
215	Conscript	3	,, ..	T. Williams ..	Bendigo
85	Convincer ..	A.	Draught ..	W. H. King ..	Banyena
144	Coolband	A.	Light ..	M. F. O'Donnell	Cowangie
45	Coronation Day ..	A.	Pony ..	H. W. Atkinson	Gritjurk
353	Costrel	A.	Light ..	F. Jeffery ..	Landsborough
626	Count Rhymney ..	6	Pony ..	D. J. Bourke ..	Monomeith
542	,, Traquair ..	A.	Thoroughbred	T. D. Ryan ..	Tatura
78	Craigieburn Premier	4	Draught ..	F. C. Thomas ..	Blackheath
530	Craigwillie of Bolobek	5	,, ..	Gillis and Walter	Werribee
691	Cross In Hand Charmer	A.	,, ..	F. E. Coster ..	Sarsfield

STALLIONS REGISTERED FOR 1920-21—*continued.*

Cert. No.	Name.	Age.	Class.	Owner.	Address.
		Yrs			
716	Crown Derby ..	A.	Draught ..	W. G. Graham ..	Tongala
354	Crown Derby ..	A.	Light ..	J. A. Kirkpatrick	Lismore
624	,, Jewel ..	A.	Draught ..	Kuhne Bros. ..	Rainbow
63	,, Steel ..	A.	Thoroughbred	O. Coghlan ..	Miner's Rest
271	Culloden	A.	Light ..	E. R. Campbell	Nypo
267	Cutty Sark ..	A.	Pony ..	L. Dureau ..	Woodford
672	Dalmeny	A.	Draught ..	A. J. Ritchie ..	Arawatta
322	Dalmore	A.	,, ..	J. Bunge ..	Sheep Hills
124	Dandy Again ..	A.	Pony ..	A. Cameron ..	Warracknabeal
151	,, ,, ..	A.	,, ..	R. Lawler ..	Ouyen
252	,, Junior ..	A.	,, ..	R. F. Carmody ..	Everton
355	,, Lad ..	A.	,, ..	Stuckey Bros. ..	Flynn's Creek
356	,, ,, ..	A.	,, ..	A. C. Head ..	Mansfield
197	,, Style ..	4	,, ..	S. R. Lobb ..	Nagambie
357	Dandy's Pride ..	A.	,, ..	F. V. Franenfelder	Wodonga
580	Darling's Comet ..	4	Draught ..	Brock Bros. ..	Moe
625	Dawn of Hope ..	A.	,, ..	T. J. Whinray ..	Kyneton
57	Decorum	6	Light ..	J. H. Beer ..	Boort
637	Decorator ..	A.	,, ..	F. E. Jennings ..	Inglewood
358	Demo Dick ..	A.	,, ..	A. E. Nuske ..	Kewell
96	Demolition ..	A.	Thoroughbred	A. R. Tink ..	Kaniva
54	Derby Chimes ..	A.	Light ..	H. Saunders ..	Wodonga
200	,, Scheme ..	2	Draught ..	T. Maddern ..	Blackheath
359	De Wet	A.	Thoroughbred	E. Land ..	Oxley
281	Dibdale	6	Light ..	G. Officer ..	Woolsthorpe
721	Dick Alto ..	A.	,, ..	J. Phyland ..	Ascot Vale
245	Digger	6	,, ..	R. Dunbar ..	Harston
360	Digitalto	A.	,, ..	E. Cuthbert ..	Camperdown
361	Dillon Bell ..	A.	,, ..	S. J. Lewis ..	Baringhup
519	Direct Alto ..	3	,, ..	G. Howells ..	Inglewood
276	Director	A.	,, ..	G. E. Marshall ..	Dunolly
362	Direct Way ..	A.	,, ..	R. Matchett ..	Bendigo
190	Discord	A.	,, ..	C. Eames ..	Barnawartha
567	Doctor	A.	Pony ..	J. B. Cleeland ..	Newhaven
25	Donald's Best ..	3	Draught ..	D. Kelly ..	Kunat
595	Don Huon ..	A.	Pony ..	W. Lyons ..	Drouin
323	Donibristle	A.	Draught ..	Wilson Estate ..	Milawa
363	Don Olive.. ..	A.	Pony ..	A. Cheisley ..	Barnawartha
161	Dontourie ..	4	Light ..	W. McGowan ..	Sea Lake
269	Dorregal Chief ..	4	Draught ..	C. R. McCallum	Pepper's Plains
329	Douglas Chief ..	5	,, ..	F. W. Sallmann	Dimboola
324	Dreadnought ..	A.	,, ..	J. W. Baker ..	Donald
9	Druce	A.	Light ..	A. W. Cakebread	Footscray
325	Drum Laddie ..	A.	Draught ..	A. E. Barker ..	Kyabram
326	Drysdale	A.	,, ..	A. Dunn ..	Buckrabanyule
568	Duddon	A.	Thoroughbred	E. W. Dixon ..	Cowes
364	Duke of Melton ..	A.	Light ..	Hoysted Bros. ..	Wangaratta
327	Dundonald's Chief ..	A.	Draught ..	H. Doherty ..	St. James
328	Dunmore	A.	,, ..	J. R. Stokes ..	Ballarat
329	Eastern Star ..	A.	,, ..	D. and G. McDonald	Minyip
564	Electioneer ..	A.	Light ..	G. J. Shaw ..	Yarram
643	Elksley Commander	A.	Draught ..	J. Talbot ..	Coreen, N.S.W.
641	Emblem	A.	Thoroughbred	Lee Bros. ..	Coleraine
694	Emulator Junior ..	A.	Light ..	A. W. Bowman	Keysborough
226	Emulator's Pride ..	A.	,, ..	W. McArthur ..	Noorat
365	Erin's Bard ..	A.	Thoroughbred	E. O'Connell ..	Geelong
665	Excel	A.	Pony ..	W. C. Holt ..	Foster

STALLIONS REGISTERED FOR 1920-21—*continued.*

Cert. No.	Name.	Age.	Class.	Owner.	Address.
		Yrs.			
26	Fairfield	A.	Light ..	C. S. Walker ..	Swan Hill
366	Falmouth	A.	Thoroughbred	A. F. Cullen ..	Wahgunyah
623	Fast Time ..	A.	Pony ..	W. Crilly ..	Shepparton
330	Federal Prince ..	A.	Draught ..	G. Luckie ..	Springhurst
331	,, ,, ..	A.	,, ..	G. M. Vallence ..	Cohuna
71	,, Tax ..	A.	,, ..	J. T. Williams ..	Tandarra
367	Federation ..	A.	Pony ..	B. Rogers ..	Mepunga East
123	Fidelio	A.	Thoroughbred	J. Sweeney ..	Boolite
55	First Grattan ..	4	Light ..	H. Saunders ..	Wodonga
369	,, Voyage ..	A.	,, ..	Busst and Glasheen	Huntly
86	Flash Donald ..	A.	,, ..	J. Morris ..	Curyo
287	Flashwood ..	3	,, ..	R. Elvis ..	Korweinguboora
642	Fitzallan	A.	Draught ..	S. P. Vaughan ..	Nyam
332	Flowerdale ..	A.	,, ..	D. L. Bodey ..	Jung
518	Fluten	A.	Pony ..	W. H. Penaluna	Boolarra
620	Flying Star ..	A.	Light ..	O. Martin ..	Leongatha
333	Fred	A.	Draught ..	A. Dunning ..	Numurkah
601	Freedom	A.	Light ..	J. Montgomery ..	Milawa
666	,, ...	2	,, ..	Paterson and Sons	Foster
336	Gallant Knight ..	A.	Draught ..	H. R. Lee ..	Clunes
125	Gamelition ..	4	Light ..	J. W. Chace ..	Willenabrina
370	Garnet	A.	Pony ..	S. Hutton ..	Penshurst
27	General Foch ..	4	Draught ..	R. Williams ..	Swan Hill
89	Gentleman Jack ..	6	Light ..	T. E. W. McGauchie	Piavella
39	General McDonald ..	A.	Draught ..	W. Pacholli ..	Mysia
697	Giru	A.	Thoroughbred	W. J. Clark ..	Sunbury
617	Gisborne	A.	Draught ..	Mrs. A. H. Stewart	Chinkapook
337	Gladiator	A.	,, ..	H. Jeitz ..	Rainbow
165	Glen Arthur ..	3	,, ..	C. T. Henderson	Windermere
178	,, Dale.. ..	3	,, ..	A. J. McDougall	Katundra
711	Glengarry ..	A.	Pony ..	W. L. Stewart ..	Newbridge
159	Glenlea	A.	Draught ..	A. F. Smith ..	Yaapeet
612	Glenmarkie ..	A.	,, ..	J. Cook ..	Rochford
704	Glenmore	A.	Light ..	J. F. Prankerd ..	Gillingall
282	,, Prince ..	4	Draught ..	J. Stapleton ..	Netherby
602	Glenroy	A.	Light ..	J. M. Kerr ..	Linton
162	Glenscott	4	Draught ..	P. McNeil ..	Kyneton
240	Glenspean ..	A.	Thoroughbred	A. Cameron ..	Warracknabeal
540	Glynne Loch ..	4	Light ..	R. Costello ..	Gifford
283	Gold Brew ..	A.	Thoroughbred	J. White ..	Dunkeld
212	Golden Action ..	5	Light ..	W. Watts ..	Kamarooka
187	,, King ..	A.	,, ..	H. Neary ..	Bowman's Forest East
636	Goldie	A.	,, ..	W. J. Minns ..	Melton South
216	Golden Voyage ..	3	,, ..	R. Johnson ..	Bendigo
371	Gold Tuck ..	A.	,, ..	J. J. G. Barns ..	Euroa
127	Grand March ..	6	Draught ..	H. J. Carr ..	Charlton
372	Grattan Bells ..	A.	Light ..	T. Shearwood ..	Dooen North
373	Gratton's Voyage ..	6	,, ..	Busst and Glasheen	Huntly
33	Gratton Junior ..	A.	,, ..	W. J. Parish ..	Horsham
138	Guide's Wing ..	A.	Pony ..	J. Lawless ..	Burramine S.
48	Guy Tod	5	Light ..	W. Williams ..	St. Arnaud
631	Hafren Sensation ..	A.	Pony ..	Miss B. B. Reid	Bundoora
374	Halcyon	A.	,, ..	Mrs. J. M. Maclellan	Windsor
175	Hambletonian Direct	A.	Light ..	R. S. Wright ..	Yarraberb

STALLIONS REGISTERED FOR 1920-21—*continued.*

Cert. No.	Name.	Age.	Class.	Owner.	Address.
		Yrs.			
692	Hames	A.	Light ..	W. Dean ..	Bairnsdale
375	Hamilton Emulator Junior	A.	Pony ..	Todd Bros. ..	Willerabrina North
406	Hamiltonian ..	A.	Draught ..	H. E. Poulton ..	Hopetoun
407	Hampton Ben ..	A.	,, ..	Todd Bros. ..	Willenabrina North
376	Handyman ..	A.	Thoroughbred	H. F. Clarke ..	Miepoll
377	Happy Jack ..	A.	Pony ..	J. B. Atchison ..	Southern Cross
378	,, Vein ..	A.	Thoroughbred	Fitzpatrick Bros.	Boort
644	Harmattan ..	A.	,,	C. Tobin ..	Eskdale
557	Harold A. ..	A.	Light ..	R. M. Smith ..	Landsborough
23	,, Bells ..	A.	,, ..	W. A. Towtt ..	Walpeup
228	,, Wilkes ..	6	,, ..	Mrs P. Shipp ..	Richmond
155	Harry Almont ..	A.	,, ..	J. Ross ..	Wedderburn
380	,, Alto ..	A.	,, ..	A. G. Hunter ..	Seymour
379	Harvest Agan ..	A.	,, ..	W. J. Clarke ..	Tiega
558	Hayston	A.	Thoroughbred	A. E. Barker ..	Kyabram
3	Headwind ..	A.	,,	Moonee Valley Racing Club	Moonee Valley
381	Heather King ..	A.	Pony ..	M. W. Dwyer ..	Merino
382	Hermes of Shetland Heights	A.	,, ..	Mss. J. M. Maclellan	Windsor
383	Here's Luck ..	A.	,, ..	Jensz Bros. ..	Antwerp
707	Hero Laddie ..	A.	Draught ..	H. F. Robinson	Kerang
408	High Commander ..	A.	,, ..	Dean Bros. ..	Euroa
565	,, Commissioner	3	,, ..	J. Baxter ..	Sale
569	,, Degree ..	5	,, ..	J. Galloway ..	Majorca
179	,, Honour ..	5	,, ..	C. H. Feldtmann	Major Plains
79	,, Tide ..	4	,, ..	J. T. Bartlett ..	Brown's Plains
53	Hillhead Knight ..	A.	,, ..	E Middleton ..	Hamilton
575	Hivites	A.	Thoroughbred	F. N. Heywood	Toongabbie
705	I Am Here ..	A.	Pony ..	A. A. Smart ..	Buchan
118	Interest	A.	,, ..	A. Kennedy ..	Arcadia
185	Ipidi	A.	Thoroughbred	J. O'Keefe ..	Shepparton
547	Jack Annandale ..	A.	Light ..	A. O. Foster ..	Maffra
384	,, Huon ..	A.	,, ..	F. G. Ronalds ..	Buninyong
385	,, McKinney ..	A.	,, ..	D. Moriarty ..	Wee-Wee-Rup
664	,, Smith ..	4	Draught ..	S. Maddern, jun.	Leongatha
153	,, Style ..	5	Light ..	Mrs. H. Whitchurch	Mildura
533	Jock McCraw ..	4	Draught ..	Williamson and Coghill	Wendouree
262	John Mac ..	4	,, ..	Mrs. Biddlecombe	Shelford
84	Jolly Maltster ..	A.	Thoroughbred	Department of Defence	Melbourne
386	Judge Byron ..	A.	Light ..	R. Galway ..	Stratford
527	Jumbo	A.	Pony ..	C. N. W. Kallawk	Elingamite
387	Junot	A.	Thoroughbred	N. McDonald ..	Purnim
409	Karamu Glenmarkie	A.	Draught ..	R. Heywood ..	Gannawanna
167	Kelly	3	Pony ..	G. Howlett ..	Murtoa
10	Kelmscott II. ..	3	Draught ..	A. W. Lackman	Murrayville
346	Kelm's Pride ..	A.	,, ..	J. Dugdale ..	Myrniong
633	Kemp Daly ..	A.	Light ..	G. H. Minns ..	Melton
410	Kelso	A.	Draught ..	R. Williams ..	Chinkapook
388	Kentucky ..	A.	Light ..	T. M. Kerr ..	Lismore
93	Kewell's Pride ..	3	Draught ..	A. C. Petrass ..	Kewell
411	Kilburnie	A.	,, ..	A. E. Whitfield	Terrick South
76	King Albert ..	5	,, ..	G. Francis ..	Horsham

STALLIONS REGISTERED FOR 1920-21—*continued.*

Cert. No.	Name.	Age.	Class.	Owner.	Address.
		Yrs.			
233	King Ballance ..	4	Draught ..	F. H. Kennett ..	Kaniva
389	,, Bally ..	A.	Pony ..	H. Lee ..	Clunes
390	,, Bee	A.	,, ..	W. T. McAlpine	Hopetoun
237	,, Duncan ..	A.	Draught ..	P. Leydon ..	Cooma
112	,, Harold ..	A.	Light ..	T. S. Young ..	Horsham
31	Kingling	A.	Thoroughbred	W. McDonald ..	Dimboola
415	King of Clubs ..	A.	Draught ..	M. Skeyhill ..	Weerite
563	,, Kings ..	A.	,, ..	E. Don ..	Newham
416	,, Ury Park ..	A.	,, ..	L. A. Sallmann ..	Dimboola
391	King Owyhee ..	A.	Light ..	W. Barkmeyer ..	Koondrook
603	King's Clydesdale ..	A.	Draught ..	R. Milbus ..	Jeparit
418	,, Pride ..	A.	,, ..	G. T. Hill ..	Baddaginnie
645	Kingston	A.	,, ..	Hawkins and Henebery	Myrtlebank
596	King Wilks ..	A.	Light ..	J. Brights ..	Mirboo
646	Kinlock	A.	Draught ..	W. Hicks ..	Miram
392	Kintyre	A.	Light ..	McGregor Bros.	Rochester
169	Kola Mauritius ..	5	,, ..	J. A. Wilson ..	Kerang
419	Knight Royal ..	A.	Draught ..	C. Hebard ..	Cavendish
131	Laddie o' Groat ..	4	,, ..	W. H. Gillett ..	Lara
104	Latest Style ..	6	Light ..	H. Brown ..	South Geelong
709	Laird Gowrie ..	A.	Draught ..	F. Corner ..	Rushworth
420	Lee Creek Favourite	A.	,, ..	Ewart Bros. ..	Dargalong
5	Leevialand ..	6	Light ..	A. Bickley ..	Sunshine
393	Leeway	A.	,, ..	A. J. McGillivray	Rainbow
590	Lena's Abbey ..	A.	,, ..	W. C. Greaves ..	Monomeith
394	Leonard	A.	,, ..	H. F. J. Lovett..	Corowa, N.S.W.
395	Le Rosier ..	A.	,, ..	E. Parish ..	Horsham
421	Lilburne Regent ..	A.	Draught ..	J. Hargreaves ..	Eskdale
422	Linkwood ..	A.	,, ..	J. and T. Hamilton	Tatyoon
423	Lion Prince ..	A.	,, ..	J. F. Hurley ..	Bobinawarrah
396	Little Billy ..	A.	Pony ..	C. Pratt ..	Watchupga
1	,, Black Pony ..	A.	,, ..	W. Armstrong ..	Branxholme
198	,, Comet ..	4	,, ..	T. McNally ..	Seymour
121	,, Prim ..	4	,, ..	J. D. G. Hartwich	Hamilton
37	,, Tich ..	A.	,, ..	O. Stares ..	Longford
397	,, Welshman ..	A.	,, ..	J. F. Kelly ..	Emu
548	Llang Graeme ..	5	Light ..	W. J. O'Brien and R. J. Johnston	Bushy Park
90	Lloyd George ..	4	Draught ..	J. Price ..	Mologa
278	Locksley	A.	,, ..	C. F. Schulze ..	Arkona
549	Lord Aldie ..	4	,, ..	McCarthy Bros.	Boisdale
398	,, Anthony ..	A.	Thoroughbred	J. J. Britt ..	Rainbow
682	,, Bindi ..	A.	Draught ..	R. T. Yapp ..	Bindi
399	,, Bingen ..	A.	Light ..	E. J. Janetzki ..	Jeparit
241	,, Dalmuir ..	4	Draught ..	G. Harders ..	Dimboola
424	,, Dunbar ..	A.	,, ..	M. Giles ..	Hopetoun
425	,, Everest ..	A.	,, ..	Oldham and White	Dunkeld
51	,, Jellicoe ..	4	,, ..	J. Frith ..	Nyang
572	,, Kitchener ..	3	,, ..	A. K. Lange ..	Armytage
700	,, Lonsdale ..	A.	Pony ..	D. G. Tomkins ..	Coleraine
174	,, Lynden ..	A.	Draught ..	J. Vickers ..	Colbinabbin W.
64	,, Nolan ..	A.	Thoroughbred	O. Coghlan ..	Miner's Rest
347	,, Northcote ..	A.	Draught ..	J. Dugdale ..	Myrniong
400	,, Panic ..	A.	Light ..	D. J. Hamer ..	Croydon
265	,, Percival ..	A.	Draught ..	J. Clifford ..	Glenormiston S.
69	,, Pilatus ..	A.	Thoroughbred	H. Agnew ..	Horsham

STALLIONS REGISTERED FOR 1920–21—*continued.*

Cert. No.	Name.	Age.	Class.	Owner.	Address.
		Yrs.			
426	Lord Plunton ..	A.	Draught ..	J. Elliott ..	Tatura
19	,, Ronald ..	A.	,, ..	E. Allan ..	Ondit
427	,, Shepherd ..	A.	,, ..	W. J. Jenkins ..	Burrereo
206	,, Threve ..	3	,, ..	J. Watkins ..	Euroa
428	,, Trentham ..	A.	,, ..	C. Maher ..	Tatura
429	,, Valcourt ..	A.	,, ..	J. H. Roulston ..	Gritjurk
107	,, Wallace ..	4	,, ..	J. Farrell ..	Briagolong
556	Lorryman ..	A.	,, ..	C. Baldry ..	Cosgrove
566	Lost Time ..	A.	Thoroughbred	A. Martin ..	Maffra
285	Louecn	4	Light ..	W. G. Anderson	Craigieburn
621	Lou Lou's Dandy ..	A.	Pony ..	L. W. Clarke ..	Doreen
349	Loyalist	A.	Draught ..	O. Gray ..	Wedderburn
676	Lucky Jim ..	A.	,, ..	W. Cadman ..	Corryong
660	Lymn Champion II.	A.	,, ..	E. Wilson ..	Leongatha
654	Lyndhurst ..	3	,, ..	A. Arnold ..	Warracknabeal
430	Lymn Forest Boy ..	A.	,, ..	A. Evans ..	Beulah
616	Mahomet	A.	Pony ..	A. Brown ..	Rupanyup
401	Mainstitch ..	A.	Thoroughbred	R. W. Storey ..	Murchison East
432	Magician	A.	Draught ..	T. Adkins ..	Korumburra
433	Major Dale ..	A.	,, ..	F. J. Edwards ..	Charlton
434	.. ,, ..	A.	,, ..	J. McDougall ..	Katandra
435	.. McDonald ..	A.	,, ..	G. Luckis ..	Springhurst
28	,, Ribbonwood	3	Light ..	C. S. Walker ..	Swan Hill
412	,, Style ..	A.	Draught ..	T. J. Carson ..	Monbulk
141	Malacca	A.	Light ..	Beattie Bros. ..	Tungamah
402	Maldon	A.	Pony ..	J. E. Sage ..	Somerville
188	Maltdale	4	Light ..	H. Williamson ..	Whorouly
196	Maltese Cross ..	A.	,, ..	Witherow Bros...	Murmungee
257	Mambrino Wilkes ..	A.	,, ..	W. Grant ..	Camperdown
577	Maori Chief ..	A.	,, ..	J. Caldow ..	Winchelsea
258	,, Jack ..	A.	Draught ..	A. Potter ..	Camperdown
615	Marcus	A.	Light ..	N. Jones ..	Tarneit
108	Mark Time ..	5	Draught ..	W. J. Teneby ..	Perth, W.A.
436	Marshal Clyde ..	6	,, ..	J. Nunn ..	Birchip
403	Master Brigham ..	A.	Pony ..	A. E. Harding ..	Whorouly
191	,, Dix ..	A.	Light ..	G. King ..	Wodonga
437	,, Wattee ..	A.	Draught ..	Brock Bros. ..	Moe
693	Mazarron	6	Light ..	E. W. Dwyer ..	Bairnsdale
438	McGregor's Fancy ..	A.	Draught ..	R. J. Wilson ..	Krowera
439	McLeish	A.	,, ..	A. Kay ..	Binginwarri
440	Medbourne Prince ..	A.	,, ..	S. G. Bantze ..	Emu
168	Melrose Bounty ..	A.	Light.. ..	W. Woodmason	Malvern
225	Menkawrah ..	A.	Thoroughbred	J. L. Vallence ..	Cohuna
561	Merry Peals ..	A.	Light ..	D. McLeod ..	Kyabram
58	,, Voyage ..	2	,, ..	S. J. McKay ..	Mitiamo
404	Merrimu	A.	,, ..	G. M. Vallence ..	Cohuna
581	Merzug	4	,, ..	H. Doherty ..	Hill End
614	Mick	A.	Pony ..	C. Sealey ..	Casterton
441	Middlemarch ..	A.	Draught ..	M. J. Egan ..	Charlton
638	Millstone	A.	Light ..	W. Charles ..	Maldon
232	Minstrel	A.	Pony ..	J. W. Powell ..	Becac
134	Montrae Bold ..	3	Draught ..	E. Wright ..	Pakenham W.
193	Moray Chief ..	4	,, ..	T. Thornton ..	Waaia
126	Morocco Lad ..	5	,, ..	A. Arnold ..	Warracknabeal
442	Mountain Chief ..	A.	,, ..	J. M. Connelly ..	Birchip
99	Moving Picture ..	A.	Thoroughbred	T. C. Maidment..	Moyston
405	,, ,, ..	6	Light ..	W. Fisher ..	Yaapeet

STALLIONS REGISTERED FOR 1920-21—*continued.*

Cert. No.	Name.	Age.	Class.	Owner.	Address.
		Yrs.			
231	Murite	4	Light ..	D. E. Kervin ..	Cohuna
80	Murray's Fancy ..	4	Draught ..	C. A. Lindner ..	Pleasant Hills, N.S.W.
87	Napar	A.	Light ..	E. Tozer ..	Porepunkah
443	Newfield's Baron ..	A.	Draught ..	Mrs. J. Duxson	Wallaloo
199	Newton Bold ..	5	,, ..	Gerrard Bros. ..	Mangalore West
444	,, Lad ..	A.	,, ..	T. H. Tink ..	Serviceton
648	Newton's Best ..	A.	,, ..	E. G. Bath ..	Swanwater W.
649	,, Sensation	A.	,, ..	H. H. Nairne ..	Tongala
40	Newton Style ..	4	,, ..	W. G. Wilkinson	Boomah
413	,, Stewart ..	A.	,, ..	W. Crozier ..	South Morang
103	Non Pareil ..	2	,, ..	W. A. Stewart ..	Benalla
445	Oakburn	A.	,, ..	C. A. Roberts ..	Glenalbyn
480	Oakwood	A.	Light ..	A. E. Kay ..	Dean
538	Oakwood Direct ..	4	,, ..	,, ..	,,
634	O.K.	A.	,, ..	G. H. Minns ..	Melton
73	Ochtertyre Sturdy ..	4	Draught ..	D. Ervin ..	Pyramid Hill
613	Onward	A.	,, ..	E. McKay ..	Wodonga
446	,, O ..	A.	,, ..	E. Coward ..	Congupna
447	,, Star ..	A.	,, ..	T. R. W. Powles	Katandra
663	Operation ..	A.	Light ..	T. Ley, jun. ..	Tallangatta
481	Orewar	A.	,, ..	T. J. Pratt ..	Colac
482	Orient	A.	,, ..	J. Wilson ..	Hiawatha
653	Our Bobby ..	A.	Pony ..	W. C. Younger ..	Hansonville
180	,, Guide ..	A.	Light ..	M. P. Ryan ..	Shepparton
651	O.Y.D.	A.	,, ..	P. Lyon ..	Laanecoorie
448	Papakaio	A.	Draught ..	J. Black ..	Yalca
449	Patrician	A.	,, ..	R. McKenzie ..	Wallup
49	,, Pride ..	3	,, ..	H. Knights ..	Gre Gre Village
450	Patrick's Pride ..	A.	,, ..	E. L. Edwards ..	Bacchus Marsh
284	Patriot	A.	,, ..	H. A. Armytage	Dunkeld
224	Patriotic	A.	,, ..	H. L. Ferry ..	Buangor
268	Pearl King ..	A.	Thoroughbred	W. L. Finn ..	Port Fairy
669	Pearlyn	5	Light ..	F. W. Boden ..	Won Wron
537	Peterhof	A.	Thoroughbred	W. T. Rowe ..	Wallinduc
483	Petrillott	A.	,,	W. D. King ..	Tatyoon
172	Piangil Chimes ..	2	Light ..	R. W. Cooper ..	Piangil
122	Pirateer	A.	,, ..	D. McArthur ..	Victoria Valley
270	Plumlea	A.	,, ..	P. Fischer ..	Jeparit
451	Plunket's Pride ..	A.	Draught ..	T. Crouch ..	Welshpool
453	Premier Darnley ..	A.	,, ..	A. Lowrie ..	Tyntynder Central
277	,, Jack ..	A.	,, ..	J. Edas ..	Kensington
454	,, Montgomery of Willowbank	A.	,, ..	A. Kennedy ..	Arcadia
455	,, Thomas ..	A.	,, ..	J. Macknight ..	Nyah West
456	,, Ward ..	A.	,, ..	J. A. Warburton	Lalbert
650	Preston	A.	Pony ..	E. McEvoy ..	Colbinabbin
570	Pretty Bobby ..	A.	,, ..	W. and W. G. Hall	Talbot
592	Pride of Clutha ..	5	Draught ..	J. H. Cornfoot ..	Whittlesea
132	,, the Hills ..	4	,, ..	J. R. Stokes ..	Melbourne
457	Prince Aldie ..	A.	,, ..	Brock Bros. ..	Moe
485	,, Bally ..	A.	Pony ..	J. G. Bird ..	Yarram
235	,, Bells ..	5	Light ..	R. Youren ..	Natte Yallock
70	,, Benmore ..	A.	Draught ..	W. D. Starbuck ..	Rupanyup
584	,, Charles ..	5	Pony ..	J. Dawkins ..	Cressy

STALLIONS REGISTERED FOR 1920–21—*continued.*

Cert. No.	Name.	Age.	Class.	Owner.	Address.
		Yrs.			
698	Prince Edward ..	A.	Draught ..	D. King and Sons	Rutherglen
173	,, Edward ..	4	Pony ..	A. Pearse ..	Nyah West
486	,, Harold ..	A.	,, ..	H. Robertson ..	Wallacedale
113	,, Lyall ..	4	,, ..	G. L. Buchanan	Horsham
487	,, Maurice ..	A.	Light ..	H. Perry ..	Sth Melbourne
189	,, May ..	3	Draught ..	A. Colvin ..	Nathalia
610	,, of Nullan ..	A.	,, ..	R. V. Quick ..	Brim
223	,, Que ..	A.	Pony ..	A. E. Callow ..	Ballarat
627	,, Rhymney ..	4	,, ..	D. J. Bourke ..	Monomeith
520	Punch	A.	Draught ..	E. H. B. Cleeland	Cowes
60	Punter	A.	Pony ..	R. Ready ..	Rutherglen
600	Quatta's Belmont ..	4	Draught ..	Coughlan Bros. ..	Corowa
599	,, Baron Belmontian	3	,, ..	,, ..	,,
458	Queen's First ..	A.	,, ..	Kenyon Bros. ..	Lascelles
259	Radium	4	Light ..	W. T. Manifold	Purrumbete
550	Ragged Jacket II. ..	2	Draught ..	Foster Bros. ..	Maffra
701	Rantin Robin ..	A.	,, ..	D. Clark ..	South Bundalong
81	Real Scotch ..	3	,, ..	Mitchell and O'Brien	Melbourne
459	Referee	A.	,, ..	W. T. Manifold	Purrumbete
222	Relight	A.	Light ..	D. Cameron ..	Newham
82	Ribbon Bells ..	A.	,, ..	T. Pascall ..	Melbourne
488	Richman	A.	Thoroughbred	A. Thompson ..	Kotupna
207	Rifle Boy	A.	Pony ..	R. R. Cooke ..	Euroa
114	Rising Star ..	2	Draught ..	D. L. Bodey ..	Jung
489	Robert Alto ..	A.	Light ..	A. Kennedy ..	Arcadia
703	Robin Hood III. ..	A.	Pony ..	A. T. Noyes ..	Drouin
576	Rocket	5	,, ..	R. M. Whelan ..	Apollo Bay
41	Roseneath Clandale	5	Draught ..	W. G. Wilkinson	Boomah
253	Rosewood Style ..	3	Light ..	P. Weaver ..	Boort
460	Royal Douglas ..	A.	Draught ..	T. Thornton ..	Waaia
21	,, Escort ..	A.	,, ..	Hooper Bros. ..	Devenish
461	,, Fashion ..	A.	,, ..	E. Cuthbert ..	Camperdown
177	,, Gartley ..	A.	,, ..	C. P. Butler ..	Warracknabeal
686	,, Garvin ..	A.	,, ..	G. F. Brown ..	Winchelsea
22	,, Hamilton ..	4	,, ..	J. T. Wakefield	Long Plain
163	,, Hero ..	6	,, ..	G. Giddings ..	Sea Lake
286	,, Mint ..	6	Light ..	L. A. Harper ..	Rutherglen
670	,, Reserve ..	5	,, ..	W. M. Vale ..	Yarram
30	,, Ribbon ..	A.	Draught ..	J. Morris ..	Piangil
11	,, Robin ..	A.	,, ..	J. Boyle ..	North Boort
462	,, Scot ..	A.	,, ..	D. Golding ..	Cocamba
109	,, Shepherd ..	A.	,, ..	A. Richards ..	Gymbowen
414	,, Sovereign ..	A.	,, ..	C. Ridley ..	Northcote
463	,, Standard ..	A.	,, ..	D. Foubister ..	Minyip
274	,, Style ..	5	,, ..	McQueen Bros. ..	Waubra
464	,, Success ..	6	,, ..	F. Kossatz ..	Woorak
465	,, Treasure ..	A.	,, ..	W. H. Thompson	Yalca
466	,, Willie ..	A.	,, ..	K. Cameron ..	Warracknabeal
467	,, Willie ..	A.	,, ..	F. W. Sallmann	Dimboola
628	R. W. Estell ..	A.	Light ..	A. E. Lobb ..	Lamplough
217	Safe Voyage ..	4	,, ..	V. Meyers ..	Lockwood
611	Sarsfield	A.	Pony ..	J. Heffernan ..	Kilmore
43	Sahara	4	,, ..	E. A. Maher ..	Dingwall
202	Sautrel	5	Light ..	R. W. Storey ..	Murchison East

STALLIONS REGISTERED FOR 1920-21—*continued.*

Cert. No.	Name.	Age.	Class.	Owner.	Address.
		Yrs.			
490	Scotch Spirit ..	A.	Thoroughbred	J. T. Ryan ..	Elsternwick
4	Scotland's Peer ..	5	Draught ..	G. Stokes ..	Melbourne
667	,, Stamp ..	4	,, ..	D. Trewick ..	Elmore
218	Scotty	5	,, ..	T. and J. Mason	Durham Ox.
555	,, Chief ..	A.	,, ..	A. Rintoule ..	Kinimakatka
184	Sea Lion	A.	Thoroughbred	W. Studman ..	Lucknow
15	Seldom	A.	Light ..	F. W. Barry ..	Murchison East
195	Senator	4	Draught ..	Witherow Bros...	Murmungie
491	Shandon Bells ..	A.	Light ..	A. C. Petrass ..	Kewell
242	Shanter's Pride ..	A.	Pony ..	C. C. G. Bodey ..	Dimboola
492	,, Ghost ..	A.	,, ..	W. McIntyre ..	Douglas
493	Sharpshooter ..	A.	Light ..	W. Wheeler, jun.	Towong
588	Shepherd Boy ..	4	Draught ..	Biggs Bros. ..	Clyde
468	,, Plaid ..	A.	,, ..	E. Parish ..	Horsham
229	Shillinga	4	Light ..	C. J. McLellan ..	Salisbury
609	Silver King ..	4	,, ..	M. E. McMurtrie	Albert Park
677	Silverlight.. ..	A.	Pony ..	R. J. Jarvis ..	Cudgewa
551	Sir Bute	3	Draught ..	Clyne Bros. ..	Tinamba
494	,, Carlaw.. ..	A.	Light ..	J. Bunge ..	Sheep Hills
59	,, Clyde	4	Draught ..	D. Gow ..	Hayanmi
589	,, Douglas ..	3	Light ..	A. Collins ..	Wonthaggi
263	,, Douglas Haig ..	6	Draught ..	Mrs. J. Biddlecombe	Shelford
83	,, George.. ..	4	,, ..	E. J. Griffiths ..	Tongala
534	,, Goulding ..	A.	Pony ..	S. T. Rash ..	Ballarat South
593	,, Harold ..	4	,, ..	Mrs. M. Shallard	Mernda
208	,, Hector.. ..	A.	Draught ..	F. Wallbridge ..	Somerton
192	,, Joseph.. ..	A.	Pony ..	H. F. J. Lovett..	Corowa, N.S.W.
652	,, Mac	A.	Draught ..	A. J. Donaldson	Harston
469	,, Onward	6	,, ..	W. Guymer ..	Katamatite
147	,, Walter Macgregor	3	,, ..	A. F. Fordham ..	Palpeup
699	,, Whyee.. ..	A.	Light ..	W. E. Johnstone	Woodford
470	,, Wilfred ..	A.	Draught ..	A. J. Mackay ..	Coonooer Bridge
562	,, William ..	A.	,, ..	W. A. McClellan	Bungaree
587	Skobeloff	A.	Thoroughbred	A. Thomson ..	Lismore
254	Smart Style ..	4	Light ..	R. Davis ..	Boort
696	Snowshoes ..	A.	Thoroughbred	W. J. Clark ..	Sunbury
695	Solomon IV. ..	A.	Draught ..	R. Guest ..	Willaura
139	,, Prince ..	6	,, ..	T. Hicks ..	Mulwala
220	Some Style ..	4	Light ..	T. Armstrong ..	Campbell's Creek
608	Southern Star ..	A.	Draught ..	L. Curran ..	Cannie
94	Southerton ..	A.	Light ..	F. Mason ..	Minyip
247	Speculation ..	3	,, ..	F. Bourke ..	Rochester
246	Sportsman's Hero ..	5	Draught ..	A. Kennedy ..	Tatura
154	,, ,, ..	4	,, ..	H. S. Graham ..	East Caulfield
495	Springwood ..	A.	Light ..	G. J. Vagg ..	Cobden
273	Standard	4	Draught ..	C. H. Perkins ..	Rainbow
554	,, Bearer ..	6	,, ..	J. Petrie ..	St. Arnaud N.
91	Stanley May ..	4	,, ..	G. R. Ladson ..	Mincha West
708	Starlight	A.	Pony ..	J. Giles ..	Bairnsdale
579	Stern Anchor ..	A.	Thoroughbred	R. J. McConachy	Wensleydale
115	Stewart's Fancy ..	3	Draught ..	J. H. Mayer ..	Kaniva
496	Stickup	A.	Thoroughbred	A. and J. H. Young	Blackheath
471	Sterling Prince ..	A.	Draught ..	R. H. Cumming	Bael Bael
272	Stockdale	4	,, ..	C. H. Perkins	Rainbow
472	Stockman ..	A.	,, ..	,, ..	,,
571	St. Simon	A.	,, ..	G. J. Butler ..	Carisbrook

STALLIONS REGISTERED FOR 1920-21—*continued.*

Cert. No.	Name.	Age.	Class.	Owner.	Address.
		Yrs.			
251	St. Swivan ..	A.	Light ..	S. Raine ..	Bendigo
249	Style O	5	,, ..	W. Barry ..	Heathcote
528	Sudbourn's Victory ..	4	Draught ..	A. C. Head ..	Mansfield
497	Sunbeam	A.	Pony ..	D. Ahern ..	Wahring
662	Sunbury	A.	Light ..	T. C. Nolan ..	Tarrawingee
142	Superior	A.	,, ..	D. Tallent ..	Underbool
684	Swimming Belt ..	A.	,, ..	W. T. Cox ..	Moolort
678	Taffy	A.	Pony ..	C. H. Waters ..	Corryong
586	Tax Payer ..	A.	,, ..	R. Jamieson ..	Darlington
671	The Barb	A.	,, ..	R. C. Boddy ..	Woodside
275	,, Butler ..	A.	Light ..	A. H. Siemering	Woorak
655	,, Factor ..	A.	Draught ..	C. Bates ..	Dobie
712	,, Knight ..	A.	,, ..	E. R. Morton ..	Drouin
526	,, Leeward ..	6	Light ..	H. T. Gilbert ..	Fawcett
498	,, Masher ..	A.	,, ..	W. Williams ..	Strathmerton
243	,, Outcast ..	4	,, ..	W. Elson ..	Dart Dart
106	,, Pedestrian ..	A.	,, ..	C. Loft ..	Newport
656	,, Premier ..	A.	Draught ..	J. C. Symons ..	Marong
182	,, Prince ..	3	,, ..	J. G. G. Wilson ..	Milawa
473	,, Retainer ..	A.	Light ..	R. A. Martin ..	Navarre
176	,, Standard ..	A.	Draught ..	G. W. Pickford	Wonwondah E.
499	,, Starling ..	A.	Light ..	S. Farrell ..	Stratford
553	,, Swell ..	A.	,, ..	J. G. Horder ..	Moe
500	,, Trick ..	A.	,, ..	M. Storer ..	Rainbow
501	,, Vanquisher ..	A.	Thoroughbred	G. W. Horne ..	Lal Lal
148	,, Verger ..	A.	Light ..	A. F. Cullen ..	Wahgunyah
502	,, Warrior ..	A.	Pony ..	E. McKoy ..	Wodonga
503	Thoughtful ..	A.	,, ..	P. McIntosh ..	Ondit
149	Tommy Burns ..	A.	,, ..	D. A. Terrill ..	Rutherglen
474	Tom Walton ..	A.	Draught ..	F. W. Sallmann	Dimboola
657	Topgallant ..	A.	,, ..	E. Ervin ..	Pimpinio
536	Torfrid	A.	Thoroughbred	D. Rogers ..	Boolarra
116	Tracey Alto ..	A.	Light ..	W. Calaby ..	Horsham
680	Trafalgar	A.	Thoroughbred	W. E. Mitchell ..	Corryong
50	Trelawney Again ..	5	Draught ..	Duke Bros. ..	Gre Gre Village
243	,, Time ..	5	,, ..	A. Colvin ..	Nathalia
158	True Steel ..	6	Pony ..	Letcher Bros. ..	Avon Plains
129	Trusty Servant ..	A.	Thoroughbred	A. E. Davies ..	Warracknabeal
622	Truro	A.	Light ..	M. J. O'Brien ..	Hamilton
560	Udale	A.	Draught ..	H. A. Currie ..	Sunbury
266	Union	A.	Pony ..	J. C. Hulm ..	Terang
639	Uxbridge Fyvie ..	A.	Draught ..	W. Charles ..	Maldon
535	Valmond	A.	Light ..	S. S. Hynes ..	Yendon
504	Valve	A.	Pony ..	W. C. Younger ..	Hansonville
475	Vanguard ..	A.	Draught ..	G. and W. Lord	Rosedale
170	Varco	A.	Thoroughbred	W. McMeeken ..	Kerang
145	Vanquisher ..	A.	Draught ..	W. P. Ling ..	Murrayville
52	,, ..	A.	,, ..	G. Clark ..	Wensleydale
234	Ven Error	A.	Light ..	J. C. Wallis ..	Miram
194	Victory King ..	3	Draught ..	H. C. Butler ..	Rushworth
227	Viking	A.	Light ..	A. G. Turnbull ..	Horsham
681	Volunteer	A.	Pony ..	T. B. Waters ..	Corryong
505	Welsh Flyer ..	A.	,, ..	F. Irving ..	Tyrrell Downs
183	,, ,, ..	6	Light ..	P. J. Reid ..	Milawa
573	Westmont	A.	,, ..	W. Hay ..	Bullock Swamp
140	Whakanui	A.	Draught ..	L. W. Twigg ..	Leichardt
88	What We've Got ..	6	Pony ..	G. Jones ..	Porepunkah

STALLIONS REGISTERED FOR 1920–21—*continued.*

Cert. No.	Name.	Age.	Class.	Owner.	Address.
		Yrs.			
506	White Stockings ..	A.	Light ..	Munro Bros. ..	Walpeup
42	Widgiewa Cavalier ..	6	Draught ..	W. G. Wilkinson	Boomah
186	,, Sapper ..	3	,, ..	W. H. Allen ..	Broughton
507	Wiewood	A.	Light ..	W. Raftery ..	Shepparton
476	Wigton Again ..	6	Draught ..	A. and J. H. Young	Blackheath
2	William of Orange ..	A.	Thoroughbred	S. Bullock ..	Essendon
477	Wimmera Prince ..	A.	Draught ..	C. Hewitt ..	Werrigar East
508	Windlesham ..	A.	Thoroughbred	J. Ferguson ..	Horsham
509	Winteridge ..	A.	,,	J. D. Forsyth and W. Coe	Coleraine
679	Wonder	5	Pony ..	J. F. Webb ..	Alexandra
117	Wonga	A.	Light ..	E. Parish ..	Horsham
607	Yeneda	A.	Thoroughbred	D. A. Hutchison	Yan Yean
640	Young Badaween ..	A.	Pony ..	T. J. Morley ..	Beulah
20	,, Brigham ..	A.	,, ..	J. A. Darlington	Paradise
260	,, ,, ..	A.	,, ..	J. H. Hindhaugh	Weerite
511	,, Clarionet ..	A.	Light ..	J. Mitchell ..	Piavella
250	,, Clyde ..	A.	Draught ..	Currell Bros. ..	Cowley's Creek
517	,, Comet ..	A.	Pony ..	T. Adkin ..	Korumburra
606	,, Coronation ..	A.	Draught ..	W. J. Bennett ..	Cannie
166	,, Croydon ..	A.	,, ..	F. Town ..	Boort
29	,, Cymro Bach	6	Pony ..	A. B. Anderson	Poowong
574	,, Dandy's Pride	A.	,, ..	J. W. Powell ..	Becac
66	,, Dundonald	A.	Draught ..	W. Williamson ..	Whorouly
552	,, Flashlight ..	A.	,, ..	H. W. Vavasseur	Bairnsdale
261	,, Ginger ..	A.	Pony ..	W. T. Manifold	Purrumbete
92	,, Hamilton ..	A.	Draught ..	Arnold Bros. ..	Rupanyup N.
12	,, Hero ..	A.	,, ..	S. J. Taylor ..	Lake Boga
512	,, ,, ..	A.	Pony ..	F. W. Hender ..	Franklinford
605	,, Jimmy ..	A.	,, ..	S. Adkins ..	Strezleckie
128	,, Linkwood ..	6	Draught ..	J. H. Peverill ..	Charlton
513	,, Llandor ..	A.	Pony ..	W. Nebel ..	Thomastown
478	,, Lord Dundonald	A.	Draught ..	A. McDonald ..	Laen
629	,, Lord Lyon..	A.	,, ..	G. R. Main ..	Malmsbury
101	,, Major ..	4	,, ..	McDougall Bros.	Maroona
668	,, McLeish ..	A.	,, ..	J. Charlton ..	Stony Creek
479	,, Middlemarch	6	,, ..	P. J. O'Donohue	Gooroc
604	,, Nailstone ..	A.	,, ..	Schroeder Bros...	Murrayville
143	,, Patrician ..	A.	,, ..	F. E. Southwell..	Linga
515	,, Recruit ..	6	Pony ..	F. A. Hay ..	Cobden
230	,, Repeater ..	4	Draught ..	G. H. Derkert ..	Nhill
95	,, Shepherd ..	3	,, ..	G. Chapman ..	Minyip
514	,, Yelretso ..	A.	Light ..	M. Ford ..	Maryborough
516	Zolock O. ..	A.	,, ..	D. McLeod ..	Numurkah

RAINFALL IN VICTORIA.

Second Quarter, 1920.

District.		April.	May.	June.	Quarter.
		Points.	Points.	Points.	Points.
Mallee North ..	1920	29	84	107	220
	Normal	70	131	133	334
	Per cent. Departure ...	−59	−36	−20	−34
Mallee South ...	1920	29	118	112	259
	Normal	90	139	166	395
	Per cent. Departure ...	−68	−15	−33	−34
North Wimmera ...	1920	18	173	220	411
	Normal	108	169	209	486
	Per cent. Departure ...	−83	+2	+5	−15
South Wimmera ...	1920	27	224	312	563
	Normal	146	201	267	614
	Per cent. Departure ...	−82	+11	+17	−8
Lower Northern Country	1920	37	107	206	350
	Normal	110	181	218	509
	Per cent. Departure ...	−66	−41	−6	−31
Upper Northern Country	1920	51	134	281	466
	Normal	146	201	262	609
	Per cent. Departure ...	−65	−33	+7	−23
Lower North-East ...	1920	88	126	512	726
	Normal	173	271	385	829
	Per cent. Departure ...	−49	−54	+33	−12
Upper North-East ...	1920	176	331	795	1,302
	Normal	247	403	588	1,238
	Per cent. Departure ...	−29	−18	+35	+5
East Gippsland ...	1920	281	172	116	569
	Normal	225	243	309	777
	Per cent. Departure ...	+25	−29	−62	−27
West Gippsland ...	1920	354	223	332	909
	Normal	278	314	350	942
	Per cent. Departure ...	+27	−29	−5	−4
East Central ...	1920	320	274	443	1,037
	Normal	273	328	338	939
	Per cent. Departure ...	+17	−16	+31	+10
West Central ...	1920	119	215	255	589
	Normal	179	216	239	634
	Per cent. Departure ...	−34	0	+7	−7
North Central ...	1920	86	228	377	691
	Normal	175	260	328	763
	Per cent. Departure ..	−51	−12	+15	−9

RAINFALL IN VICTORIA—*continued*

District.	—	April.	May.	June.	Quarter.
		Points.	Points.	Points.	Points.
Volcanic Plains ...	1920	81	203	335	619
	Normal	182	230	265	677
	Per cent Departure ...	−55	−12	+26	−9
West Coast ..	1920	150	311	452	913
	Normal	229	305	349	883
	Per cent. Departure ...	−34	+2	+30	+3

N.B.—100 points = 1 inch.

H. A. HUNT,
Commonwealth Meteorologist.

THE PRODUCTION OF MINT FOR ITS OIL.

Peppermint grows most profitably on non-acid peaty soils, but if the moisture is good little trouble will be experienced even on upland soils. There is a large market in this State for both oil and dried leaves, but the crops have never been cultivated to any extent, except for supplying mint for the vegetable market.

The crop is propagated from roots and runners from old plantations, and set in rows 3½ feet apart and 4 to 5 inches deep. The roots are carried in a sack over the shoulder, and are dropped into the furrow and covered by scraping the soil with the foot. One acre of old bed will provide sufficient plants for 10 to 20 acres.

Harvesting is done about the time the plant comes into bloom and before the lower leaves drop. The yield of oil is always greatest in hot, dry weather, and heavy rains at harvest time reduce the yield. On large areas the harvesting and curing are somewhat similar to haymaking. The mint may be cut with a mowing machine and allowed to lie in the swath for about a day or longer, according to the weather, to allow of the evaporation of excess moisture and wilting of the leaves. The crop is placed in windrows, cocked, and then taken to the still. If the hay is fairly dry, a charge of the still (steam process) should not take longer than thirty to forty minutes, but a damp sample may require two hours.

In the United States, where the crop is extensively grown, two crops are obtained annually, though the second crop is only about half the quantity of the first cut. The conditions under which this crop is usually grown in America are cooler than ours, and we should therefore produce more crops. The yield varies from 25 to 80 lbs. of peppermint oil per acre, averaging about 40 lbs., and about 20 lbs. from the second cut. The amount of hay averages 1 to 1½ tons per acre, and, if dried after distilling, can be fed to farm stock. The plantations are profitable for eight or ten years.

The prevailing prices are 20s. per lb. for spearmint oil, and 15s. to 18s. for peppermint. The market for the dried leaves also offers inducements to the prospective peppermint-grower. Leaves at present fetch 2s. 6d. per lb., and the normal pre-war figure ranged round 1s. 3d. The existing supply (as of other dried herbs) is considerably smaller than the demand.—*Agricultural Gazette of N.S.W.*, Vol. XXXI., Part 6.

ORCHARD AND GARDEN NOTES.

E. E. Pescott, F.L.S., Pomologist.

The Orchard.

Cultivation.

Orchard ploughing should now be finished, and the main work for the next few months will be an endeavour to keep the soil surface loose, friable, and well opened. The consolidation of the surfaces must be avoided, as a hard, compact surface means the loss of much soil moisture, by capillary attraction. So that after rains, heavy dews, the spray pump and other traffic, it will be as well to run the harrows over the surface of the soil, so as to keep the surface well broken and to maintain a good earth mulch. If the harrows are not sufficient to break the clods, a spiked or heavy roller should be drawn over it, and then harrowed. If the weather is at all dry it is advisable to plough only as much as may be harrowed in the same day. By immediately following up the ploughing with harrowing a minimum amount of moisture is lost by capillarity.

Green manure crops should now be ploughed under, and should they be very abundant in growth, a roller should be run over them and ploughed with a coulter attached. Any of these means will serve to get the crop underground, which is a desideratum.

In addition to the retention of soil moisture, cultivation of the orchards will suppress the weeds which rob the trees of food and moisture. The suppression of weeds is an important work in the spring and summer, and they should be rigorously hoed or cultivated out.

Spraying.

Spraying for all pests and diseases is, at this time of the year, an important work in the orchard. Bordeaux or lime sulphur spraying for the black spot of apples and pears, for scab and shothole in peaches and apricots, for the leaf curl of the peach and rust of the plums and peaches, should now be completed.

Where there are indications that previous sprayings have not been thoroughly successful, a weak lime sulphur spray should be given.

Wherever they are present, nicotine sprays should be given to combat the peach aphis, and the pear and cherry slug. For the latter pest, arsenate of lead should not be used if the cherries are within a month of ripening. Arsenate of lead is so tenacious, and thus it is likely to remain on the fruit until it is ripe, when it would be dangerous to the consumer. Thus, while this property of remaining on the fruit for a considerable time is of great value in the Codlin Moth spraying, it is quite of the opposite value when used for the pear and cherry

slug. Either tobacco water or hellebore is useful for the eradication of this pest, as these substances do not remain long on the trees, and they are quite as effective as arsenate of lead. Even a dry dusting with lime or with ordinary soil will keep the slugs in check.

Codling moth spraying, too, will be in evidence this month. It is generally assumed that the appearance of the moth is coincident with the bursting of the flowers. This is not always so—the moths frequently come slightly later than the blooming period. Owing to the rapid expansion of the fruit, it is well to follow the first spraying with a second in a week or ten days' time. Arsenate of lead is still the spray for the Codlin moth, nothing having been found to supersede it.

Arsenate of lead may be mixed with nicotine sprays, or with Bordeaux mixture, without any detriment to either spray, if necessary.

The Vegetable Garden.

A good tilth, and a well-pulverized soil, are the main soil necessities in the vegetable garden this month. Frequent cultivations will keep in the soil moisture, and will obviate the necessity for surface waterings. At the same time, it should be remembered that the vegetable garden requires more water than the flower garden, owing to the quick growth of the plants. Quickly-grown vegetables are more tender and more luscious than slowly-grown ones: thus a good water supply will need to be maintained. Weeds are great moisture-robbers, and they should be kept out of the vegetable garden at this time of the year.

Late plantings of tomatoes may now be carried out; all early-planted plants should be fed, staked, and the laterals pinched back. A little bone-dust or superphosphate may be given, but these are not equal to animal manures, if the latter are available. Chemical manures should only be given in limited quantities, 6 or 7 cwt. per acre would be a heavy dressing, and this works out at nearly 3 ozs. per square yard. Vegetable growers may easily try this for themselves, and it will soon be seen that 3 ozs. scattered over a square yard of surface will appear to be a very light dressing.

French beans, carrot, parsnip, celery, radish, peas, and turnip seeds may now be sown. Seeds of cucumber, melon, and pumpkin family may now be sown in the open ground. All seedlings may be transplanted on favorable days, and it will be well to sprinkle the tops as well as to water the roots.

Asparagus beds may be top-dressed with manure, and kept well weeded. Such weak growths that are not gathered for eating should be cut out of the beds.

The Flower Garden.

Flower gardens are troubled with many pests at this time of the year. Rose aphis is one of the most prevalent; frequent applications of tobacco water will keep this pest in check. The hot winds should not be waited for so as to rid the garden of the pests, because a great deal of damage is done before the hot winds come. They should be sprayed in any case.

Rose mildew will also need combating. This may be done by dusting the bushes with sulphur while they are wet with the morning dew. The ground may also be sprinkled, as the fumes check the fungus.

The latest American remedy is to dust the bushes with one part of dry arsenate of lead to nine parts of sulphur. This is also a remedy for black spot of roses.

Leaf-rolling or leaf-eating insects will need to be sprayed with arsenate of lead or Paris green.

The surface should be kept well hoed so as to conserve the moisture, especially after the frequent waterings that should be given.

Chrysanthemums may be planted in soil that has been dug over two or three times, and each time digging in manure. The soil must not be too rich, but must be well drained.

Bulbs that have lost their foliage may be lifted, but do not cut the foliage, as this means loss of sap and energy.

Asters, zinnias, salvias, balsams, amaranthus, celosias, &c., lobelia, bedding begonia, iresines, alternantheras, &c., may now be planted out for summer and autumn flowers.

REMINDERS FOR NOVEMBER.

LIVE STOCK.

HORSES.—Continue to feed stable horses well; add a ration of greenstuff. Rug at night. Continue hay or straw, chaffed or whole, to grass-fed horses. Feed old and badly-conditioned horses liberally. If too fat, mares due to foal should be put on poorer pasture. Turn out workers due for a spell at grass. In view of sand trouble this year horses which have been paddocked all the winter should not be put to work until properly conditioned and any sand accumulation got rid of. A course of three or four bran mashes, after a twelve hours' fast, followed by 1 to 1½ pints of linseed oil, is helpful. Repeat in two or three days, if necessary. Colts to be gelded should be operated on before hot weather sets in.

CATTLE.—Except on rare occasions, rugs may now be used on cows at night only. Continue giving hay or straw, if possible, to counteract the effect of green grass. Be prepared for milk fever. Read article in *Year-Book of Agriculture*, 1905, page 314. Give calves a dry shed and a good grass run. Continue giving milk at blood heat to calves. Be careful to keep utensils clean, or diarrhœa will result. Do not give too much milk at a time for the same reason. Feed regularly with regard to quantity and time. Give a cup of limewater in the milk to each calf, also place crushed oats or lucerne hay in a trough so that they can eat at will.

PIGS.—Supply plenty of bedding in well-ventilated styes. Keep styes clean and dry, and feeding troughs clean and wholesome. Sows may now be turned into grass run. Sows suckling young should be well fed to enable them to produce plenty of milk. Give young pigs pollard and skim milk in separate trough as soon as they will take it, and keep them fattening from the start to get them off as early as possible. Give a tablespoonful of bone meal, or half that amount of mineral phosphate per 100 lbs. live weight in food daily. If

pigs are lousy dress them with kerosene emulsion or sulphur and lard, rubbing well into crevices of skin, and disinfect styes. Pig breeding and feeding should be very profitable for a long time to come, and it should be safe to launch out now.

Sheep.—Prepare for dipping. Ascertain exact contents of bath before mixing. Powder or paste dips have the most lasting effect, particularly where lice have been bad. Hold sheep in the bath not less than half a minute; if badly infested, longer. Submerge heads twice, but allow them to rise quickly—most deaths after dipping are due to gross carelessness in holding sheep under too long, the dip wash being taken in on to the lungs. Dip rams and full grown sheep first, while bath is full, lambs last. Yard sheep over night. Dip while empty, and avoid fouling the drainer. Commence early in the day, and allow sheep to dry before nightfall. Avoid travelling long distances to and from baths, and dipping sheep while overheated. Do not roughly throw sheep in. Avoid filthy baths; this increases a dead tip in hot areas.

It is unsafe, and against instructions, to use powder dips in increased strength. Sheep badly lice-infested should be dipped directly off shears, and again in six weeks' time. Sheep with over a reasonable amount of wool on should be dipped at less strength than given on instructions. Close, fine-wooled sheep particularly so.

When constructing new dips, remember moderate-sized ones are most economical, just as efficient, and can be more easily emptied as they become fouled, and if they are near water can be quickly filled.

Poultry.—Provide plenty of green food and shade. Watch for vermin; spray crevices of perches and houses with crude carbolic acid, 1 in 50. Keep water clean and cool, and out of the sun. One packet of Epsom salts should be given to thirty birds through the mash. Remove all male birds from the flock. Infertile eggs are preferable when pickling, or when placed in cool storage.

CULTIVATION.

Farm.—Plant main crop of potatoes. Cut hay and silage. Weed early potatoes. Sow maize and millets. Weed tobacco beds, and water, if dry.

Orchard.—Ploughing, harrowing, and cultivating to be continued. Weeds to be kept down. Secure, pinch, and spray grafts with water. Spray frequently for codlin moth, pear and cherry slug, and peach aphis. Plant-out citrus trees.

Vegetable Garden.—Hoe and mulch surface. Suppress weeds. Water where dry and hoe afterwards. Disbud and pinch back tomato plants. Sow French beans, peas, lettuce, cucumber, melon, &c., seeds.

Flower Garden.—Water and mulch. Cultivate and keep down weeds. Thin out weak wood from roses. Prune early all flowering shrubs that have finished flowering. Lift and store bulbs. Plant out chrysanthemums. Liquid-manure herbaceous perennials. Sulphur-dust for rose mildew.

Vineyard.—Field grafts require careful attention in the way of removal of suckers and scion roots. (See *Journals* for September and October, 1918.) Keep a sharp look out for Downy Mildew, and commence spraying on the appearance of the very first symptoms of the fungus. Though mildew only showed up in one or two localities last season, the fungus is not dead, but dormant; heavy rain in late October or early November is certain to lead to its reappearance. In the absence of spraying a visitation as disastrous as that of 1917-18 is by no means impossible. Even if the fungus is not visible, spraying should be concluded by the beginning of November in the north, and a week later in the cooler districts. Reprints of articles on this fungus obtainable on application. Cultural work, such as scarifying and hoeing, should be actively pushed forward, so as to provide as good a "mulch" as possible during summer. Proceed with tying up, stopping and topping. Avoid excessive topping, summer pruning being usually more injurious than useful in warm, dry climates. Cincture Zante currant vines after flower caps have fallen. Apply second sulphuring just before blossoming, wherever Oidium was prevalent last year.

Cellar.—Taste all young wines; beware of dangerous symptoms in unfortified fruity wines, which may need treatment. Fill up regularly all unfortified wines.

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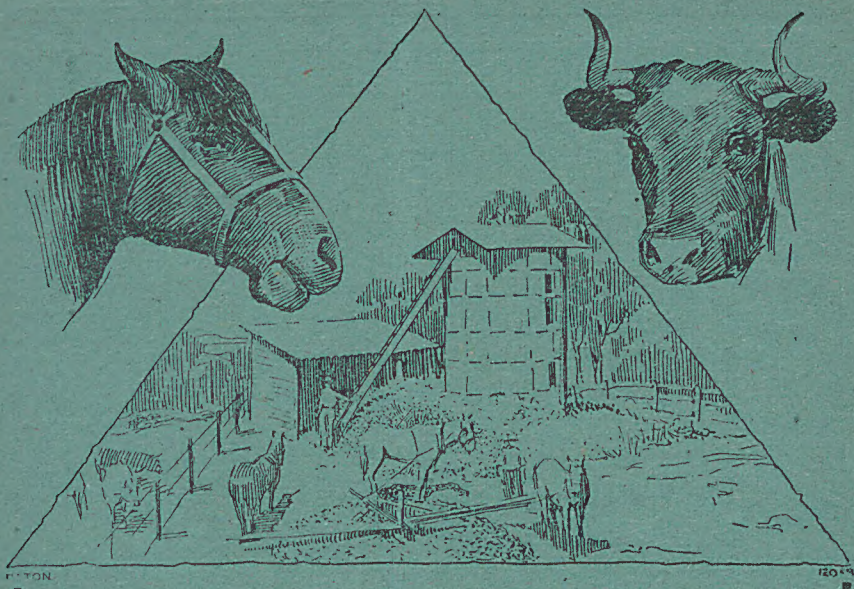

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